THE IRON AGE

New York, November 11, 1915

ESTABLISHED 1855 VOL. 96 : No. 20

Machine Design in a Rhode Island School

Practical Shopmen as Instructors to Produce Designers and Draftsmen Who Will Be Acquainted with Standard Modern Shop Practice

BY W. E. FREELAND

A Rhode Island business man who desired to place his son with one of the well-known manufacturers of machinery of his home State was given this advice: "Give your boy three years at the Rhode Island School of Design and then send him to us. His training there will help him to grow faster with us." This statement well expresses the attitude of the local machine builders toward this Providence school which was founded in a small way over thirty years ago. It also finds generous support in numerous scholarships given by the State and the city of Providence. The director of the school is L. Earle Rowe.

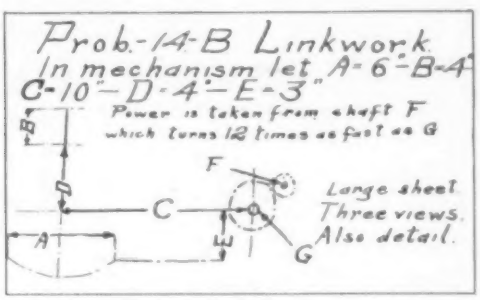
Shop Work and Drafting Are Studied in Relation to Each Other to Develop Perspective in Machine Designing

The mechanical department has an enrollment of 35 day and 160 night students. At the opening of the present school year this department moved into a four-story building with about 15,000 sq. ft. of floor space available for its purposes. The ground floor is equipped as a machine shop and the three upper floors for the teaching of drafting and mathematics. All the work is individual and there is no class work in either the day or night classes, so that a student has a chance to advance as fast as his ability will permit. True to its name and purpose, every effort is made by the school to develop any special aptitude of a pupil as a designer, but in the instruction special emphasis is placed on the fact that no student has the right to consider himself as a designer when he receives his diploma; that he has only acquired the foundation and that he must build thereon a structure of practical experience.

Students in the day courses are received on individual judgment of their fitness for their chosen vocation and are usually of preparatory school age. The night classes are composed mostly of mechanics who are seeking a better or a special education. Some of the boys in the day courses are sent to the school by their employers and the work done in the school counts on their apprenticeship record. One of the results of the past record of the school is that but few of the Rhode Island manufacturers now take apprentices into their drafting rooms, preferring to employ graduates of the school or to send selected boys to the school for training.

A glance over the list of instructors helps to explain the somewhat unique standing of the school in the estimation of employers. The head of the department is John A. Taudvin, for eighteen years with the American Screw Company and now consulting engineer of the Eastern Bolt & Nut Company. Baxter R. Waldron, for thirty years with the American Screw Company, is in charge of the machine shop, and Annie C. Clark, Ph.B., Brown University, is teacher of mathematics. With the night students, Mr. Taudvin has charge of the ad-

vanced pupils; Z. R. Tucker, head of the apprentice department of Brown & Sharpe Mfg. Company, has charge of the intermediate pupils; and Jacob C. Millard, designer of jigs and fixtures at the Brown & Sharpe Mfg. Company, has charge of the beginners. J. P. Burdick, a graduate of the Massachu-



The Student Gets His Problem Outlined on a 3 x 5-in. Card

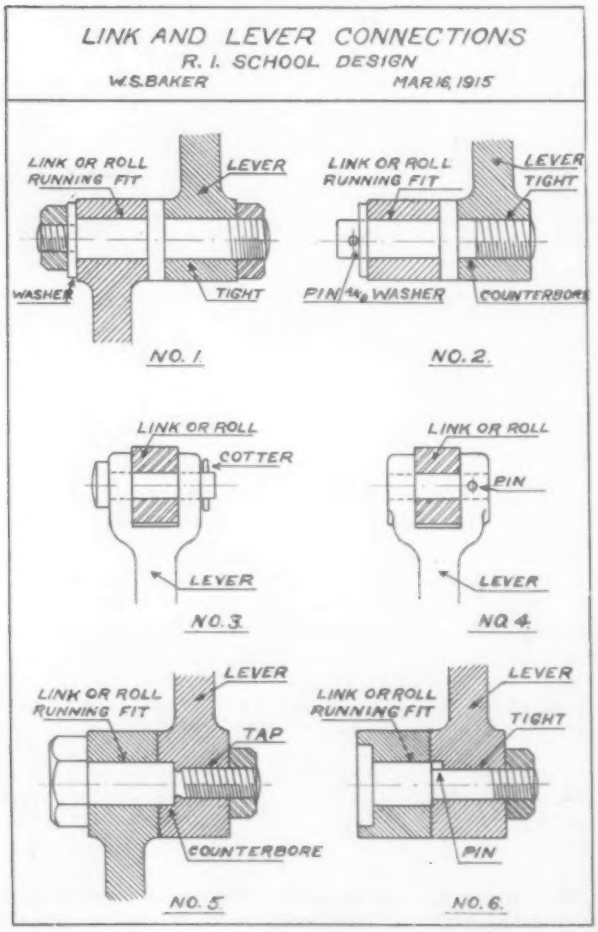
setts Institute of Technology and connected with the Brown & Sharpe sales department, teaches mathematics. Four other assistants are employees of the same concern: Benjamin P. Graves, designer of milling machines; John W. Parker, tool designer; Charles M. Morrin, designer of safety appliances; and W. H. Margerison, machinist. The latter is assistant to Mr. Waldron in the machine shop.

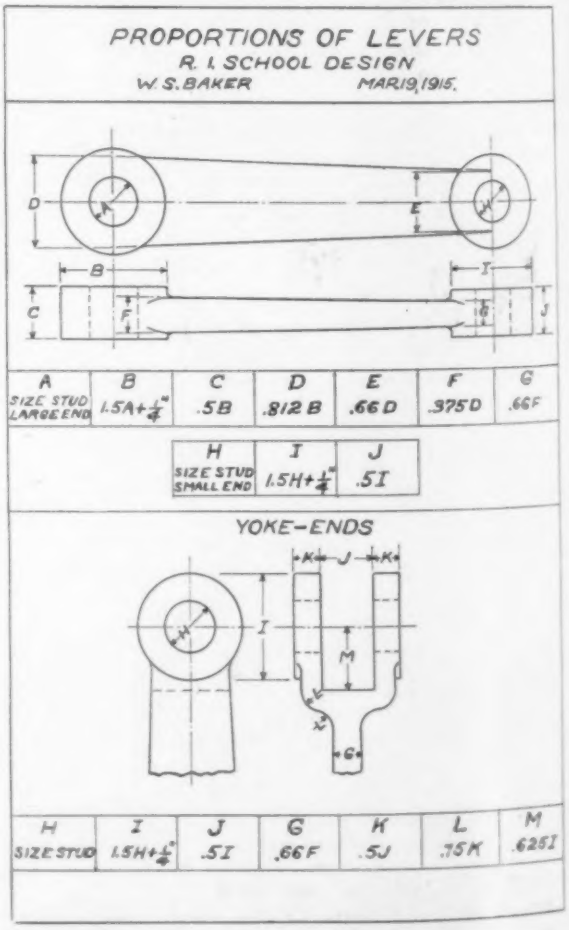
The work of the students in the first year is largely in the direction of securing a thorough knowledge of mechanical drawing and the subjects taught are freehand drawing, construction problems in plane and solid geometry, orthographic projections, development of surfaces, intersections, isometric projection, perspective, screw threads, bolts and screws, springs, cam design, lever design, gear design, sketches, assembled and working drawings, shop arithmetic, algebra and shop work. The school performs a notable work for employers who send boys to the school by weeding out the unfit or those who through mistaken ambition have unwisely selected mechanical drawing as their vocation.

In the two following years the work includes problems in mechanical movements, the graphic representation of forces, problems in shafting, bearings, couplings, pulleys, belting, rope-drives, gearing, levers, jig-work, patent-office drawings, complete designs and working drawings of steam engines and boilers, economizers and chimneys, concluding with the design of a machine for a given purpose as the basis of a thesis report. This year there has been added an evening class in jig, fixture and tool design for draftsmen or advanced students who have satisfactorily completed the elementary work.

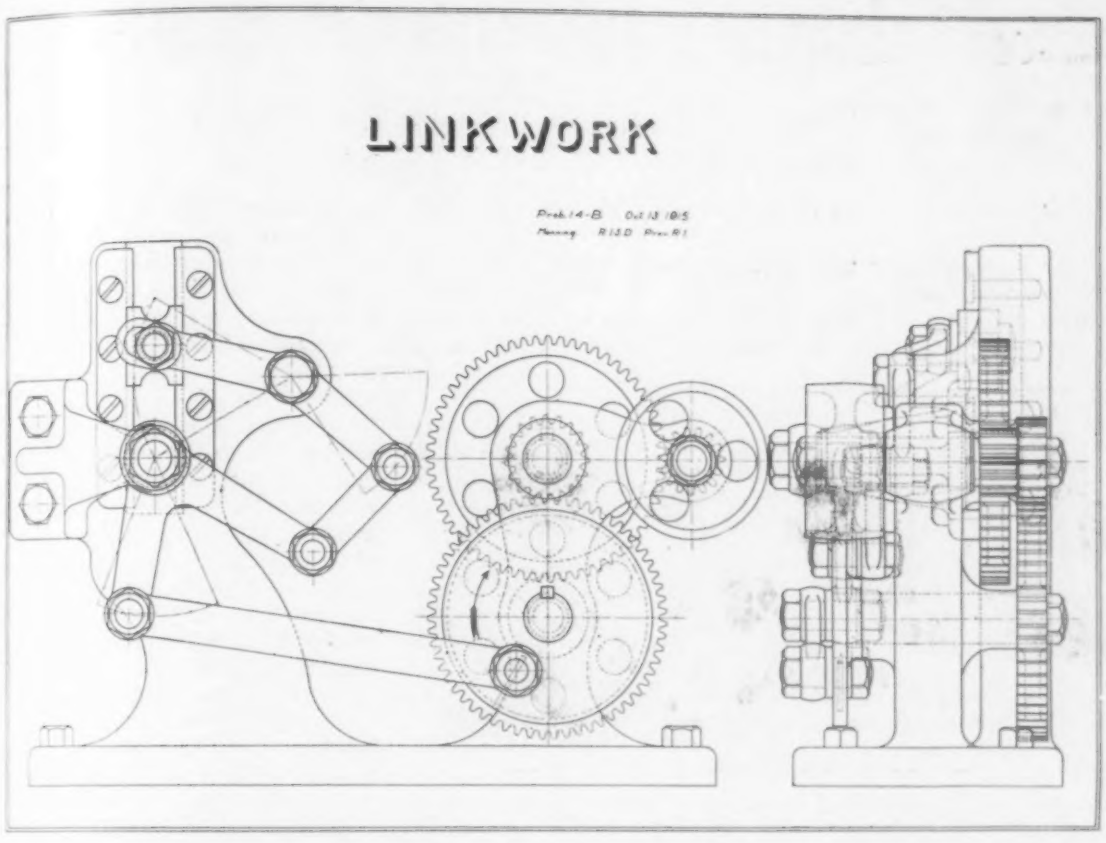
In mathematics the students are taught shop arithmetic, cutting speeds and feeds, pulley speeds and gearing ratios, lathe change gearing, change gears for milling spirals, milling machine indexing, use of formulas and diagrams, angles and angular measurements, figuring tapers, horsepower of belting and shafting, principles of levers, algebra, geometry and trigonometry.

When a pupil enters the school he is immediately started on shop work, of which he has at least 5 hr. a week during his three years' course. This gives him a practical shop experience desirable in a draftsman. In his third year the student is given special instruction in pattern making in the woodworking division of the normal arts department of the school. The more advanced students frequently find opportunity to work part time in the plants of local manufacturers, thus adding to their stock of practical experience.





Blueprints Covering Details of Parts Are Referred to in Evolving the Design



Student's Drawing of the Completed Mechanism Called for by the Problem

Two or three of the third year pupils are made assistants in the machine shop and a boy in his second year is given a first-year student to instruct in the use of the various machine tools. It has been found that this experience helps the advanced students to crystallize the knowledge that they have acquired and make it serviceable. It has been demonstrated that the beginners advance much more rapidly in learning to operate the machines when taught partly by another boy than they do when taught wholly by an older instructor.

All the turning or other machining work is on practical work, never as an exercise. In this way the interest of the boys is held at high pitch by its appeal to their constructive instinct. At this time the day students are engaged in building two lathes to add to the equipment of the machine shop. In the last half of his second year a boy begins to link together his work as a draftsman and as a machinist, for at about that time he begins to construct parts that he has himself designed and finds out by actual experience some of the things that a designer must recognize and ever keep in mind if he is to do his share in keeping down machining costs.

The aim of the school to teach its students to think is emphasized by the material furnished as the basis for problems in mechanical drawing. In the case of the linkwork problem shown in the illustrations, the data given the student comprise a small card giving dimensions and speeds and two blueprints covering proportions of levers and link and lever connections. In this instance both of these blueprints contain data based on the standard practice of the Brown & Sharpe Mfg. Company. An automatic indexing milling machine and an automatic bolt pointing machine designed by advanced students may be mentioned as examples of the originality and skill exercised.

Among the additions to the school plant now under way is a new building to house a power plant. Here will be installed two 250-hp. Keeler dutch-oven boilers, a 160-hp. Ideal Corliss valve engine, an 80-hp. Ideal simple side-crank engine, dynamos and other apparatus. When the power plant is completed the advanced students in the mechanical department will be given practical work to familiarize them with power equipment, both steam and electrical.

A Rhythmical Market Report

The market report of Rogers, Brown & Co., Cincinnati, dated Oct. 23, shows a state of rhapsody, the writer evidently having had a visitation of the divine afflatus since activity began to be felt in the iron trade. The report is as follows:

This week has been the best we have seen since leaves began to lose their green; the tonnage placed was good and big, and covered all the grades of pig iron to be shipped throughout the land, showing progress on every hand. Good inquiries are floating 'round; $11.50 iron cannot be found.

Steel makers inquire for price, and soon will close for a good big slice of basic iron for first half use, making that grade as scarce as goose (teeth). The stove foundries without fear continue climbing in low gear, and now the malleable shops, too, have ceased to mope and feel so blue. They're buying iron to meet demands, for railroad buying still expands.

Chicago, where two weeks ago everything was deadly slow, is now almost the brightest spot, skipping along at a brisk trot. Last week a raise of seventy-five without pause was eaten alive. Another good big jump in price was this week gobbled in a trice. In fact, last week it was noted that higher prices were quoted just about universally because of the broad buying bee. Low phos. aviates week by week; silveries higher levels seek; southern Ohio went up, too, but these are only a few of those who gradually are getting prices back up to par.

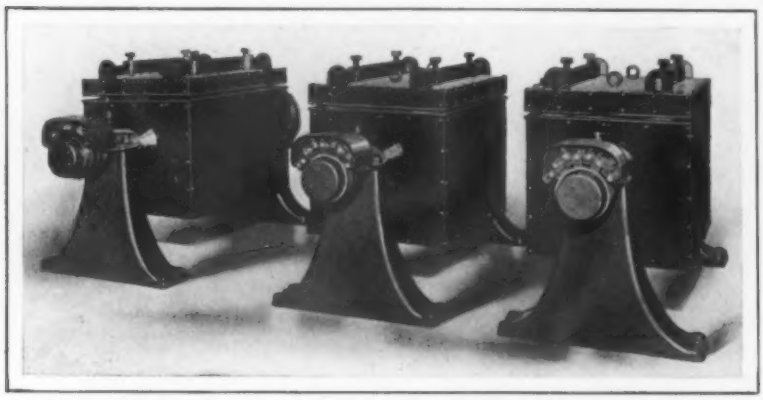
Coke also is in good demand, with prices up on every brand.

The future for all appears bright as better times disperse the night of depressed business, and it looks like all will soon fill order books.

General Electric Practice in Sherardizing

Electrically Heated Drums and How They Are Operated—Details of Salt Spray Test to Determine Life of the Protective Coating

In the sherardizing plant of the General Electric Company, Schenectady, N. Y., the drum used is of the electrically heated revolving type. It is rectangular shape and is mounted on pedestals. The driving motor is mounted on one of these pedestals and is geared to the drum through a reduction worm gear. At the present time two sizes of drums are manufactured, one having inside dimensions of 24 x 24 x 40 in., requiring 50 kw. to bring it up to the desired sherardizing temperature and 15 kw. to hold at that temperature, and a smaller one having inside dimensions of 10 x 10 x 17 in., requiring 15 kw. to heat up and 5 kw. to hold at correct temperature.



A Battery of Sherardizing Drums Having the Electric Heating Elements Located on the Top, Bottom and All Four Sides

The heating elements are placed on each of the six sides of the drum and current is supplied to them through three collector rings at one end of the equipment. The connections are such that the drum can be operated on a three-wire direct-current circuit or a three-phase alternating-current circuit. The only change necessary for the latter circuit is to leave off one of the wires leading to the three-pole double-throw switch employed.

The dust used in the process is Graselli zinc dust. This is run through a magnetic separator at least once every four weeks to take out superfluous small particles of iron which are apt to become lodged between the jaws of cotter pins, etc., and thus cause trouble in assembly. By cleaning the dust in this way the mechanical incorporation of large percentages of iron dust in the coating is also prevented. It is recommended that the weekly analysis of working dust show the iron content.

For each different heat 400 lb. of dust are used with the larger drum. This consists of 360 lb. of used dust and 40 lb. of new Graselli dust. This dust is mixed in tumbling barrel or sherardizing drum and sifted through an 80-mesh riddle before charging the drum. Once a week the used dust is mixed in a sherardizing drum and then sifted, and from this samples are taken for weekly chemical analysis.

To obtain the best results, material to be sherardized must have a clean surface, free from scale, rust, oil or paint. This is accomplished by pickling, sand or shot blasting, the last being much to be preferred. Material must be packed in the drum in such a way that no violent tumbling will occur or else sharp corners and threaded parts will be damaged; neither should it be packed too tightly, or a free flow of dust and heat will not result and consequently poor sherardizing will be obtained. By actual experience it has been found that 400 lb. of dust to any load, ranging from 400 to 1800 lb. of material, can be used. When small material is packed in individual receptacles to be placed inside of sherardizing drum, a proportion of about 5 lb. of dust to 100 lb. of material is used. Before putting the cover on the drum an asbestos wicking gasket is put under cover to make drum as nearly air tight as possible.

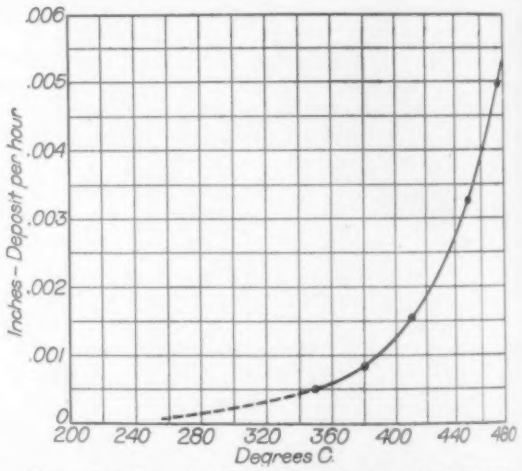
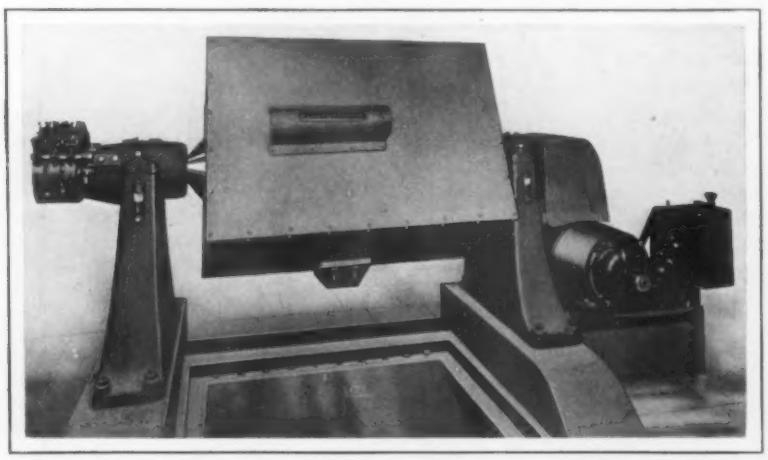


Chart Showing the Relation Between the Temperature of the Drum and the Depth of the Metallic Coating



View of One of the Drums Showing the Collector Rings Supplying the Current to the Heating Elements at the Left, the Hopper Into Which the Contents Are Discharged in the Center and the Driving Motor at the Right

The drum is started revolving at about ¾ to 1 r.p.m. and switch thrown to the high heat wiring. The high heat is used to bring drum up to desired temperature, 350 to 375 deg. C., and give the cor-

rect deposit, and then the low heat is thrown on to hold it at that temperature for the required period, 2½ to 3 hr., to give the deposit. After this current is thrown off and drum allowed to cool to 180 deg. C., at which it is safe to open the drum.

The thickness of deposit to give the best protection is 0.0025 in. on a side, or a total of 0.005 in. on a diameter. This deposit is considered the standard and where threaded parts are to be sherardized they must be undercut or overcut, as the case may be, to allow for this deposit. In the case of sherardized parts containing holes and pieces fitting these holes, the allowance for sherardizing is made in the hole; in other words, the hole is made 0.01 in. larger. This increase in deposit is equivalent to 0.85 to 1.1 oz. per square foot. In every case, material sherardized as above will stand 170 hr. as a minimum in a salt spray without showing discoloration due to corrosion of the iron, and may endure the spray even very much longer. This is considered the most satisfactory and rational test on sherardizing.

The salt spray test consists in exposing the sherardized articles that rest on a series of glass rods in a box, into which there is projected by compressed air an atomized spray of a 2½ per cent solution of sodium chloride in water. Care is taken to avoid placing the pieces directly in the path of the jet. The spray is produced by a jet of compressed air lifting the water to the nozzle, whence it is projected as a cloud of salt water and air. The temperature of the water can be controlled by a steam coil placed at the bottom of the box. The specific gravity of the water is kept at 1.026 and 1.030 at 60 deg. Fahr.

The object of the application of these metallic protective coatings is, of course, to enable the coated articles to resist atmospheric exposure without rusting for a longer time than they could withstand such exposure without protection. Obviously then, the only final test of the efficiency of a given type of coating is actual exposure to the same sort of influence that the material is supposed to resist in service. If the coating is at all efficient this takes so long a time that more rapid means of determining relative efficiencies become a necessity. The most commonly used methods of test of such metallic protective coatings are methods of chemical attack, which in effect measure either the thickness or the weight per square unit of the protective coating. Discussing the subject the experts of the General Electric Company hold that such methods of chemical attack permit the comparison of results obtained from tests upon the same sort of coating, but difficulty is encountered when an attempt is made to compare the results obtained by such tests on one sort of coating with those obtained on another character of coating.

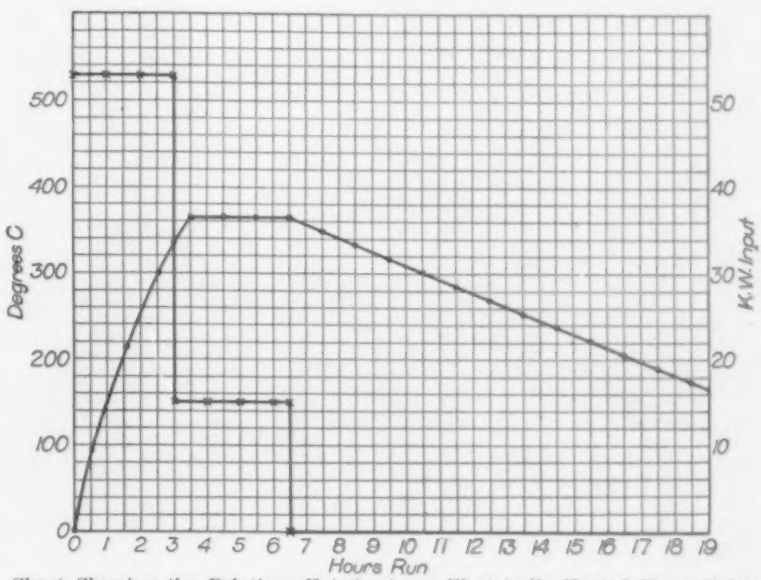
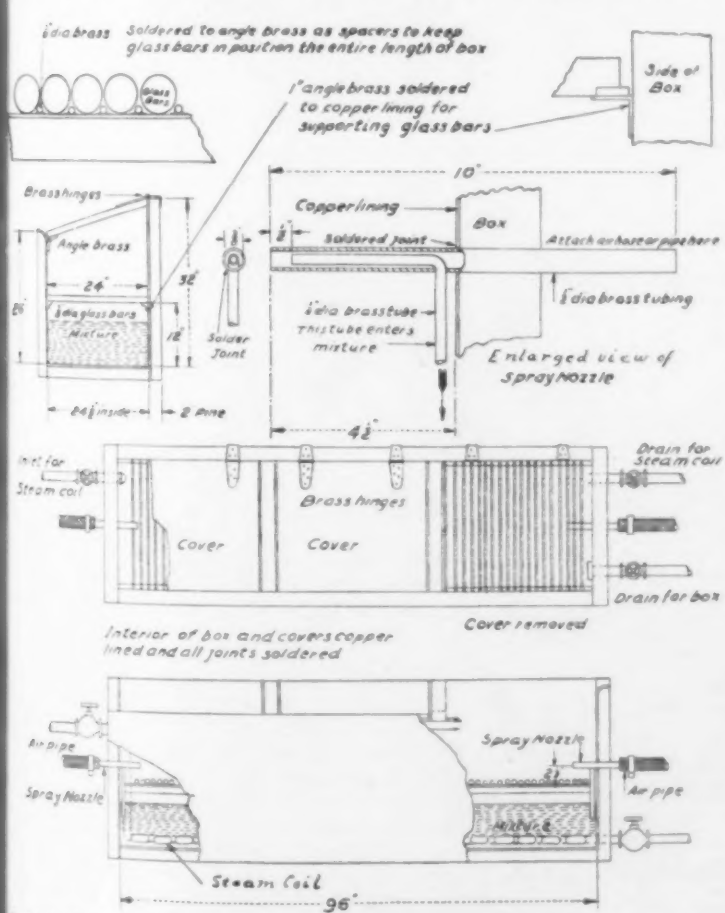


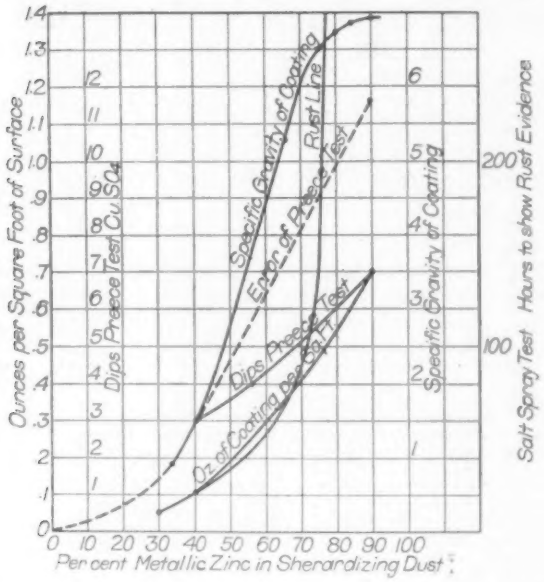
Chart Showing the Relations Existing in an Electrically Heated Sherardizing Drum Between Power Input, Time and Temperature



Details of the Salt Spray Box in Which the Sherardized Articles Are Tested to Determine the Life of the Coating

In the case of sherardized articles, it has been suggested that the coat, which is a combined structure of zinc and zinc oxide, together with some zinc-iron alloy, be removed in strong alkalies which will not attack the iron beneath. This would enable one to determine the weight of coating per unit of surface calculated to metallic zinc, but the General Electric experience has shown that the results do not necessarily indicate the efficiency of the coat, and that it is not easy to determine the relative proportions of zinc and zinc oxide.

Several years ago, when testing electrical insulation such as is used for overhead line construction, it was found that material which stood fairly well when immersed in water failed badly when exposed to the weather, especially if exposed during a hard rain. This led


Ounces per Square Foot of Surface
Dips Preece Test Cu SO4
Specific Gravity of Coating
Salt Spray Test Hours to show Rust Evidence
Rust Line
Error of Preece Test
Dips Preece Test
Oz. of Coating per Sq. Ft.
Per cent Metallic Zinc in Sherardizing Dust

Comparison of the Results Obtained by the Salt Spray and Preece Tests

to the production of a rain by sending a stream of water through an ordinary rosette such as is used with a gardener's watering can. The results were encouraging, but too severe, because the individual streams played steadily on one spot and produced erosion. An atomizing nozzle was then tried, projecting a cloud of moisture into a chamber in which the test pieces were exposed. The results were better, but there was still a possibility of some wear if the article was directly in the path of the stream and near the nozzle. The problem seemed to be solved when care was taken in placing the articles to keep them out of the direct path of the jet issuing from the atomizing nozzle. As experience was gained with this type of test, it was found that what seemed to be the essential requirement was the maintaining of an atmosphere substantially saturated with moisture, and this saturated atmosphere exposure has been one of the tests regularly applied.

The problem of determining the resistance to weather corrosion of protective coatings is, according to the General Electric attitude, very similar to that of testing insulation for weathering qualities. The conditions of exposure are the same, and there seemed to be no essential reason why the saturated atmosphere test would not apply equally well to protective coatings as to insulation. Tests were begun several years ago to try out the method, and the only fault found with it was that it was somewhat slow. Good coatings did not show any signs of breaking down after several weeks of continuous exposure to the fog, yet there was encouragement in the fact that bare metal began rusting in a few hours, and rust spots began developing on poorly protected surfaces in from a few days to a week. The fact that more trouble is experienced with trolley line suspensions along the seashore than with the same devices inland, led immediately to the trial of an atmosphere saturated with salt water with astonishingly satisfactory results.

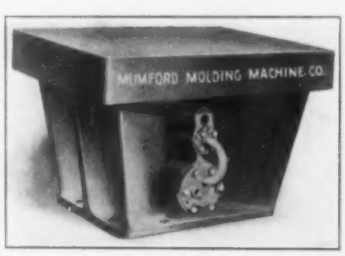
When exposed as described, articles have a very thin film of moisture over their surface, but there should be very few, if any, drops of sensible size on the objects. Obviously, the test is very searching, as all parts of the surface are exposed, and any pinholes or uncovered areas become evident. This, it is felt, gives an opportunity to learn something of the efficiency of any protecting process in taking care of edges, sharp corners, porous spots in the metal surface, etc., and by noting the character of the general final break-down, a very good idea of the evenness of the coating applied may be obtained.

The salt spray test, as it is called, has been used during the last four or five years, commercially, by the General Electric Company as a check upon the products of its process of sherardizing. It was described by J. A. Capp at a meeting on June 30, 1914, at Atlantic City, of the American Society for Testing Materials, as reported at some length in THE IRON AGE of July 2, 1914. The coated articles are exposed to the salt fog, and are examined from time to time to note their service condition. When the coated material is iron in any of its several forms red rust begins developing as soon as the coat breaks down. The appearance of this red rust may be in small pin points which gradually extend, or it may appear generally over the surface of the article. When the coating is relatively thin and poor, rust may develop in from 2 or 3 to 24 hr., or longer. A better coat will last two or three days, but a well applied coat of requisite thickness will last at least a week. If no rusting is developed in this time it is assumed that the life of the coating will be practically indefinite. These figures are based on experience with both sherardizing and galvanizing.

This method of testing sherardized articles is offered in replacement of the Preece test. Some reasons for this may be seen by referring to one of the accompanying diagrams. As an example, we may take a sample with a deposit of 0.1377 oz. per square foot of surface which has stood three dips in the Preece test and a sample with 0.7 oz. per square foot of surface, or 0.5693 oz. more which stood only seven dips when it should have stood eleven or twelve.

An 8-In. Cylinder Jolt Ramming Machine

The Mumford Molding Machine Company, Chicago, Ill., has recently placed on the market an 8-in. cylinder jolt ramming machine of two-piece construction. This form of construction is combined with the other features of the company's line of jolt ramming machines, such as full table impact and a one-piece steel valve. The machine, which has a table 30 x 42 in., has a capacity of 2500 lb. with an air pressure of 80 lb. and is designed particularly for heavy duty steel foundry work. By employing a pit pattern draft machine it is possible to handle drawbars and knuckle work.



An 8-In. Cylinder Jolt Ramming Machine of Two-Piece Construction

The first issue of the C. F. & I. Industrial Bulletin, to be published quarterly by the Colorado Fuel & Iron Company, has just appeared. Its purpose, as expressed in the "industrial representation plan" adopted by the directors and employees, is "a means of communication between the management, the employees and the public concerning the policies and activities of the company; a means of co-ordinating, harmonizing and furthering the social and industrial betterment work and of informing employees of the personnel and proceedings of conferences, boards and committees." It is to record social events and industrial developments and diffuse information of material interest. An open letter from John D. Rockefeller, Jr., in various languages, together with portraits of him and of President Welborn, also Mr. Rockefeller's address at the joint meeting of officers and employees at Pueblo on Oct. 2, 1915, are features of the issue.

Case-Hardening Retorts and Furnaces*

Different Materials Employed for the Former —Precautions to Be Observed in Packing the Boxes — Various Types of Furnaces

BY R. A. MILLHOLLAND†

The matter of retorts in which the work is to be carbonized is of great importance, more than is the prevalent conception. The pots or boxes, whichever they might be, should be of a uniform cross-section to insure an even rate of penetration in all parts of the vessel. White, gray and malleable iron and cast steel are employed extensively for making these boxes, many users claiming that the steel boxes last longer and hold their shape better under longer and more frequent heats than the boxes of other materials. It is not necessary to go that far afield for carbonizing retorts.

MATERIALS USED FOR BOXES

The writer uses various diameters of old wrought iron and steel pipe cut into lengths that will just pass through the furnace door when standing on end. One end is plugged with a thin cast-iron disk and the pipe is then heated and the edge crimped over to prevent the disk from dropping out. After the pipe has cooled a ½-in. layer of fireclay, mixed to a stiff dough, is tamped down on the inside of the pipe forming a gas-tight bottom that will last as long as the pipe itself. The lids of all carbonizing boxes should fit the opening as snugly as possible, allowing for the expansion of heated metal. A whole book can be written on the subject of carbonizing pots, but for ordinary purposes the pots made from old pipe will answer as they stand from fifteen to twenty 6-hr. heats without wearing out and scaling through the walls. As soon as the pot scales so thin that small holes appear in the walls of the pot, throw the vessel away, for it can not be repaired and the gas leakage is likely to cause the work to be imperfectly carbonized. Old pipe is much cheaper than new castings and lasts longer. Any junk dealer can furnish you with sound second-hand pipe from 2 to 12 in. in diameter. For gears and round work there is nothing to equal the pots made from old pipe. The pots should be as small as consistent with the size of the parts to be carbonized to secure rapid and thorough heating at the center of the pot.

The cast-iron boxes are usually on little feet to allow the heat to circulate on all sides and between the bottom of the pot and the floor of the furnace. The lids should be ribbed on top to prevent warping. This is not necessary in the case of pipe lids because they are entirely covered with clay and their area is not so great as that of the cast-iron boxes, hence they do not warp so badly as the exposed cast-iron lids. The cast pots can be made of a number of different materials, but experience has shown that steel castings will withstand a greater number of heats with less warping than will cast-iron pots. If the latter are used a very hard iron is highly desirable. The unannealed iron makes an excellent pot, but care must be taken in handling the new pots or loss from breakage will occur since unannealed malleable iron is very brittle.

Pressed steel pots are used by many large concerns that have their own presses and forming machines. One of the illustrations shows a steel pot designed especially for the Stewart gas furnace. As will be noticed a rib running the full length of the boxes on each side allows the operator to handle the boxes while hot with a heavy charging fork. The boxes generally run about 12 in. long by 6 in. deep by 6 in. wide. The reason for the narrowness of the box is to secure rapid penetration of heat to the center, for the more quickly the heat reaches the center of the box the sooner will the parts begin absorbing carbon. If the boxes are much larger than those described the outside rows of parts will begin to absorb carbon long before the ones in the center, and non-uniformity in the depth of carbon penetration will be the disastrous result.

PACKING THE BOXES

In packing the work in the boxes prior to the carbonizing heat, there are a number of minor details to be borne in mind. The work should be free from oil or grease. Often screw machine products are very greasy due to the cutting oil adhering to the parts which can be easily cleaned by immersing them in a boiling hot solution of caustic potash for a few seconds and then washing them off in hot water. The hot water evaporates quickly and leaves the parts perfectly clean and dry. Do not pack the parts in the boxes while they are wet because an excess of moisture is detrimental to the case hardening and the steam generated is likely to blow out the fireclay seal. Then all the carbonizing gases will escape and the parts will not absorb sufficient carbon to render them serviceable, for carbon like all other forms of energy follows the line of least resistance. It is certainly easier for the carbon to pass out of a large crack in the fireclay that the steam made than it is for it to force its way into steel.

Before any parts are put in the boxes, a layer of carbonizer should be placed on the bottom, the thickness being governed by the length of the heat that the box will undergo and also depending on whether new or old boxes are being used. On heats of 6 to 10 hr. a 1-in. layer should cover the bottom and on shorter heats, ½ to ¾ in. is satisfactory. In new boxes the tendency is to absorb carbon, cast iron especially absorbing carbon in large quantities much more rapidly than does steel. When new boxes are being run for the first two times, always increase the layer of carbonizer between the work and the walls of the box by 25 per cent to guard against the decarbonizing effect of the new castings.

It is always best to place the articles to be carbonized in regular rows in the boxes, arranging them in such a manner as to have at least four times the depth of case desired between each piece and being extremely careful not to get too close to the walls of the boxes. Keep the same distance from the walls as the bottom of the boxes. It can not be emphasized too strongly that the pieces must be kept from touching one another. It is the haphazard packing of the parts that is the cause of non-uniformity in both the depth of case and the in-

*A discussion of the materials employed in case hardening appeared in THE IRON AGE Nov. 4, 1915, and it is planned to present an account of the case-hardening process in a subsequent number.

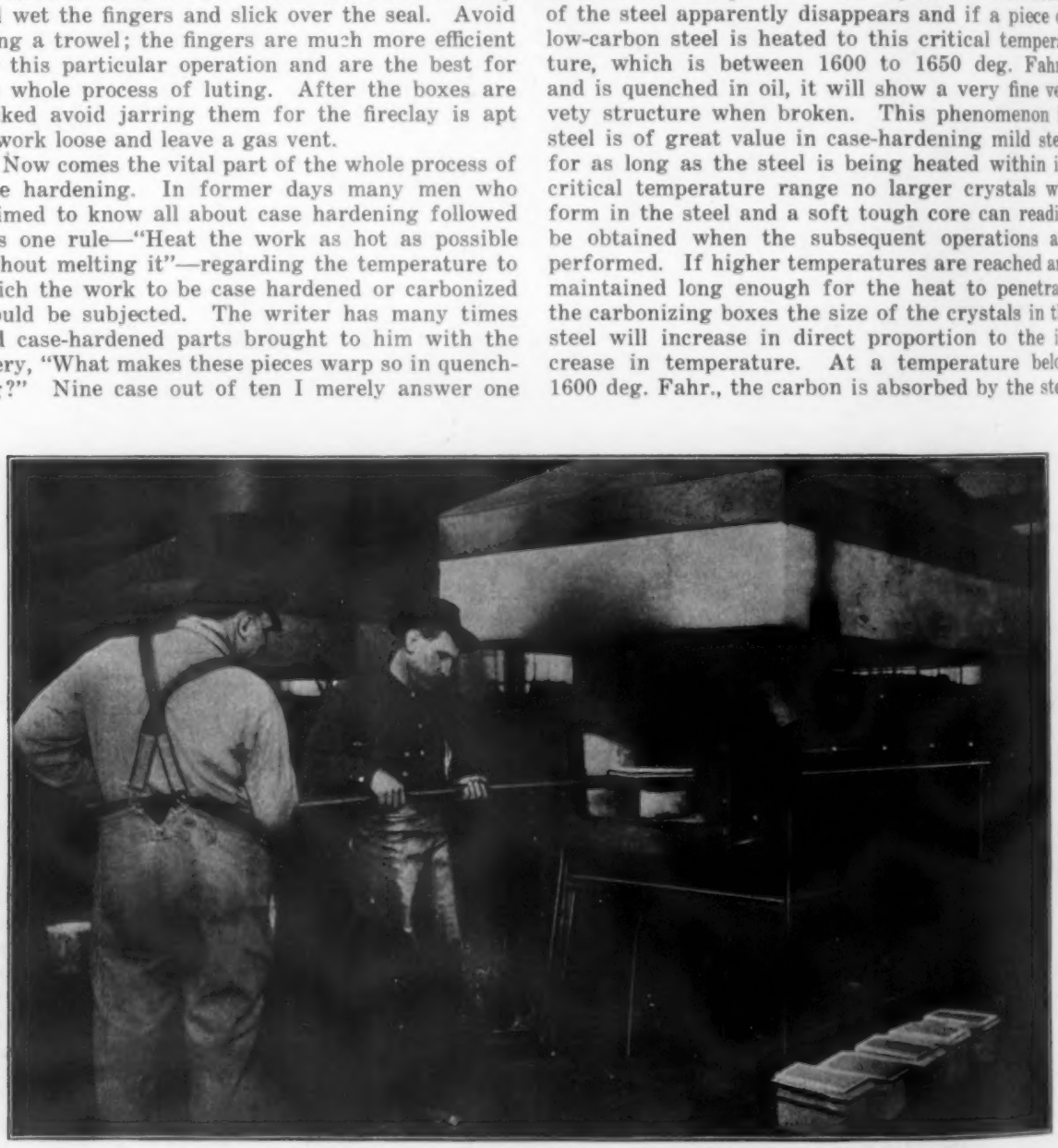
†Consulting metallurgist Millholland Tool Company, Indianapolis, Ind.

tensity of hardness. The thickness of stratum of carbonizer between the layers of pieces should be just one-half the thickness of the bottom layer, but the covering of carbonizer between the work and the lid of the box should be equal to the bottom layer.

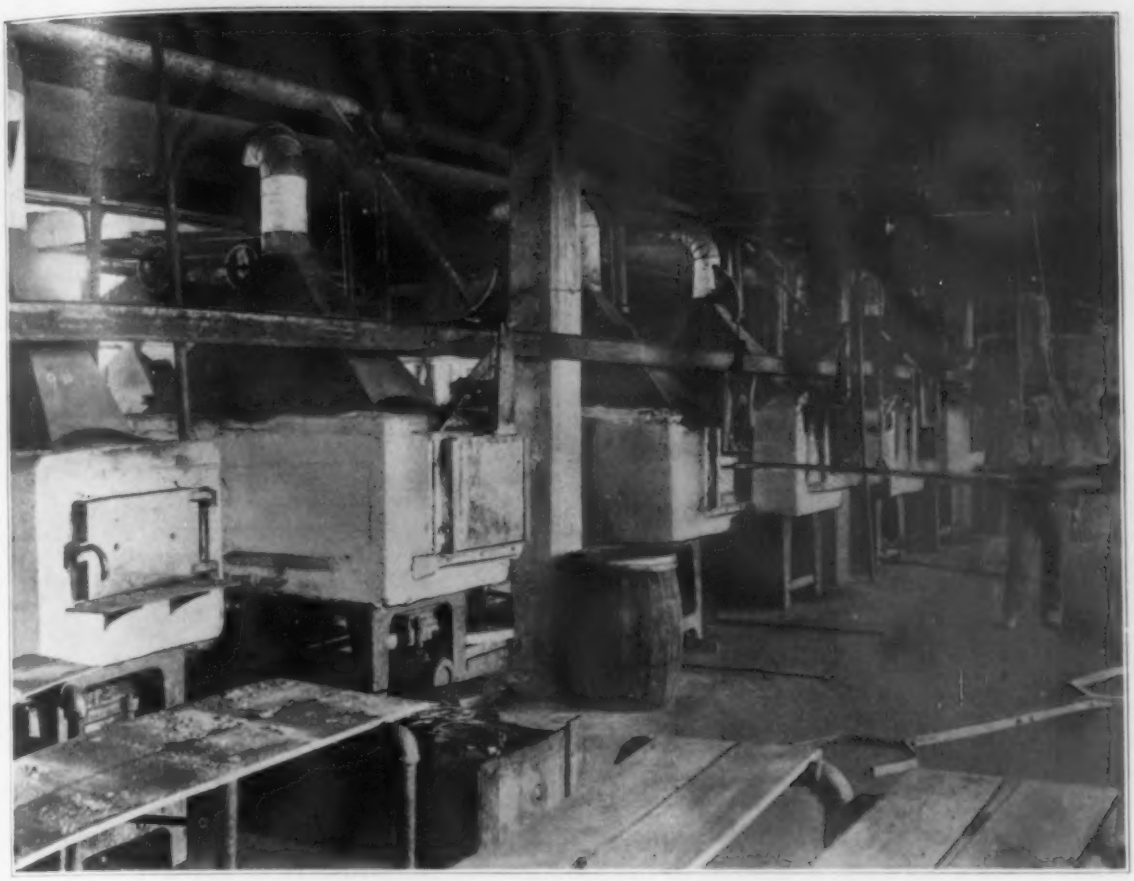
The sealing or luting of the boxes is of prime importance, and if improperly done, all the care spent in packing will not "save the heat" as the furnace man would say. In other words if the lids are not sealed on the boxes securely and gas tight, the carbonaceous gases will not penetrate the steel but will escape through the cracks and blowholes in the seal. Fireclay mixed to the consistency of putty is the best luting material yet discovered. Even this cracks away at times, but if the clay shows that tendency mix a little salt or borax with it and it will be found that the tendency to crack and flake off is almost entirely eliminated. A small handful of salt or borax to 10 lb. of fireclay will give the best results. A little trick that the writer has found to be very useful in luting up boxes is to make a long roll of fireclay and lay it around the inside edge of the box just before the lid is laid on, so that when the latter is pressed on firmly and rapped sharply with a wooden mallet the fireclay forms a gasket or packing between the edges of the lid and the sides of the box. Now seal the lid with fireclay and wet the fingers and slick over the seal. Avoid using a trowel; the fingers are much more efficient for this particular operation and are the best for the whole process of luting. After the boxes are packed avoid jarring them for the fireclay is apt to work loose and leave a gas vent.

Now comes the vital part of the whole process of case hardening. In former days many men who claimed to know all about case hardening followed this one rule—"Heat the work as hot as possible without melting it"—regarding the temperature to which the work to be case hardened or carbonized should be subjected. The writer has many times had case-hardened parts brought to him with the query, "What makes these pieces warp so in quenching?" Nine case out of ten I merely answer one of two things, "Don't carbonize at such high heats," or, "if you bring the pieces out of the furnace straight and dip them straight they won't warp so badly." The warping in most cases comes from the high carbonizing heats. It is not warping at all in the true sense of the word; it is the same thing that happens to a Christmas candle when it is left on a hot air register; it sags rather than warps. Exactly the same thing occurs with steel under extremely high temperatures. Steel becomes very soft at temperatures above 1800 deg. Fahr. and will sag and accommodate itself to the surface on which it is supported.

Now that the danger line for the carbonizing heat has been drawn it is possible to gain a clearer idea of what is the most practical temperature range for this particular process. Perhaps it may seem foolishly arbitrary to some when it is stated that 1600 to 1650 deg. is the best possible temperature range. Here is the reason why, and it is borne out by exhaustive experiments and by results obtained in commercial practice. In the first place, steel with a carbon content of from 0.10 to 0.25 per cent has a critical temperature at which the carbon changes from annealed carbon to the combined state or hardened carbon. It is also an established fact that at this temperature the crystalline structure of the steel apparently disappears and if a piece of low-carbon steel is heated to this critical temperature, which is between 1600 to 1650 deg. Fahr., and is quenched in oil, it will show a very fine velvety structure when broken. This phenomenon in steel is of great value in case-hardening mild steel for as long as the steel is being heated within its critical temperature range no larger crystals will form in the steel and a soft tough core can readily be obtained when the subsequent operations are performed. If higher temperatures are reached and maintained long enough for the heat to penetrate the carbonizing boxes the size of the crystals in the steel will increase in direct proportion to the increase in temperature. At a temperature below 1600 deg. Fahr., the carbon is absorbed by the steel



Charging a Case-Hardening Furnace with Boxes Having a Special Rib on the Sides to Facilitate the Use of a Long-Handled Fork



A Battery of Case-Hardening Furnaces Showing Both the Hinged and Counterbalanced Types of Doors

too slowly to be a commercial proposition and, besides, the amount of carbon that mild steel will absorb at low temperatures will seriously impair the hardness of the case.

When possible, the heat control of case hardening should be regulated according to a pyrometer, but it is often the case that no instrument is available and the question arises of how can the critical temperature be attained and held. The simplest way the writer has found is to charge the furnace and bring it up to the heat that the eye approximates to be within the critical temperature range. When the boxes have been heated through and through, place a small scrap of the same kind of steel that is being carbonized on top of the boxes. Let it become thoroughly saturated with heat, then remove and quench in oil as quickly as possible. If, after breaking, the piece shows a velvety fracture, then you may safely assume that the critical temperature has been satisfactorily attained. It is almost an infallible axiom that the critical temperature is the best temperature for carbonizing. If the fracture is very crystalline in structure, it is evidence that either the critical temperature has not been reached or that it has been exceeded. It takes considerable practice to tell which has been the case. Large crystals in the fracture generally indicate over-heating, but if the fracture is identical with the fracture of an annealed specimen as it comes from the mill, it is evident that the critical temperature was not reached. This method is a very crude one at best, but good results are being obtained with it, and it is a good way to check up the pyrometer.

FURNACE CONSTRUCTION AND FUELS

The subject of the proper furnace for case hardening is a big one and it is the candid opinion of the writer that some of those sold are worthless, but it is not his intention to discuss the virtues or vices of any particular make at this time. One of the illustrations shows a type of case-hardening furnace heated by gas which is built by the Chicago Flexible Shaft Company. Such a furnace for small work has many advantages over a larger size in that it requires less time to bring it to the desired heat, and it is most economical in fuel consumption. The Bellevue Furnace Company, Detroit, Mich., and also the American Gas Furnace Company, New York City, manufacture a similar type of furnace, all of which are reliable and serviceable furnaces.

A whole battery of Stewart furnaces are also illustrated. These are very similar to that shown in the other engraving, save that some have the suspended and counterbalanced door instead of the hinged arrangement. There is very little difference in advantage between the two methods of hanging the doors.

The essential principles of all carbonizing furnaces are evenness of temperature throughout the entire heating chamber and reliability of control; or in other words, a reliable means of regulating and maintaining the proper carbonizing temperature. There are three distinct types of furnaces for this purpose using different kinds of fuel. The coke-fired furnace in the past has been used extensively for this purpose, but coke as a fuel for heating case-hardening furnaces has been largely displaced by crude oil burning furnaces and by gas furnaces. For practical purposes, the oil burning furnaces have many advantages over the other two types and maintain temperatures sufficiently close for most case-hardening purposes. If natural gas is available at less than 35c. per 1000 ft., the gas burning furnaces will be found more economical. The fuel cost will be lower than for oil, and the finer heat control adds materially to its virtues. Besides gas is cleaner and a trifle safer to pipe through a building than oil, especially where the pipes cannot be run underground to the furnace. I have known of several cases where a day dreaming pipe fitter took

a cap from a 60-lb. pressure oil line, thinking it was an air line and a good deal of oil got away before the pumps could be stopped. Gas is really the safest fuel to use, though it is in most instances more costly than oil.

EXPORT PRICE RECORDS

Informing Foreign Sales Office of Changes in Production Costs

BY H. A. RUSSELL

Prices of articles for the domestic trade are usually obtained by means of list and discount or net figures. In either event the record is complete and easily understood even by those outside of the sales department. Export prices, however, are not so easy for the outsider to grasp, and while the outsider is not the one to be suited, yet the price records should be in such shape that a new man stepping into that particular branch of the sales department should have the minimum amount of studying to do. Export prices must include cost of the boxes, cases or other covering; extra labor involved in dismantling or separating the various parts, over and above the amount required for domestic shipment; freight to steamer port, etc. The prices given on the cards shown are made upon the basis of actual cost. The shipments are made on the orders received from our export office. We have nothing further to do after shipment is made from the factory.

The first card shows prices on one type of feed cutter, which are fictitious, but will serve to illustrate our method of recording them. This card shows prices for two sizes of cutters. Usually only one item is recorded on a card. On Oct. 14, 1912, we quoted the export office $16.80 for one No. 6 Eclipse feed cutter boxed, packed and delivered. On Dec. 15, 1912, we received their order No. 4814, which was subsequently filled. These cutters were not exactly what the customer required, and while they were accepted he requested that certain changes be made. Before making these changes we estimated the additional cost and advised the export office under date of April 9, 1913, what the price to them would be for the improved style, also specifying it as No. 6A, and further stating that there would be an additional charge of four or five dollars for new patterns. On Aug. 14, 1913, the export office sent their order No. 5271 for the new style cutter at the new price. When shipment was made on Aug. 24, the additional charge of $4.60 for patterns was included in the invoice to the export office. A notation was made at the bottom of the card for future reference.

The other card gives a list of repair parts shipped, order number, date and price. On Oct. 1, 1913, we completed a price list of all parts for this new style feed cutter and advised the export office that the cost to them, including packing and freight, could be ascertained by taking 20 per cent from the list price.

There is no other card record that the writer is familiar with that needs to be kept as accurately as this one. The index must be well subdivided. The index cards should be of good material, suitable for hard and constant usage. The ordinary subdivisions of the alphabet can be used but much better results will be obtained if the cards are printed specially for this record system. We use celluloid tipped index cards, and they have paid for themselves several times over, besides keeping the wording free from blurs, etc.

There is one item of cost which is often overlooked and which pertains more to export shipments than to domestic, and that is the various methods of packing the same article for different customers. One will want his shipments packed so that one complete item is in each case. Another will wish to have all the wood parts in one case and the iron parts in another. Again someone else will require five sets of irons in a case and five sets of woods in another case. All these variations will affect the cost and must be noted where necessary. Usually it is cheaper to pack the irons and the woods separately; that is, where a number of sets are included in each case, but even here the

Fred Cutter - Eclipse — NEW YORK PRICES

Date	DESCRIPTION	Disc.	Boxing and Packing	Frt.	N. Y. Price	Date	DESCRIPTION	Disc.	Boxing and Packing	Frt.	N. Y. Price
2 10/14/12	#6 Complete				$16 80	2 10/14/12	#8 Complete				$20 10
#4814 12-15-12	" "				$16 80	#4981 1-14-13	" "				$20 10
2 4/9/13	#6A "				$17 80	2 4/9/13	#8A "				$21 15
#5271 8/14/13	" "				$17 80	#5271 8/14/13	" "				$21 15
8/24/13	Chgd. for New Patterns $4.60					8/24/13	Chgd. for New Patterns $5.30				

Typical Card Used by an Exporter of Agricultural Implements to Record the Prices Charged on Foreign Shipments

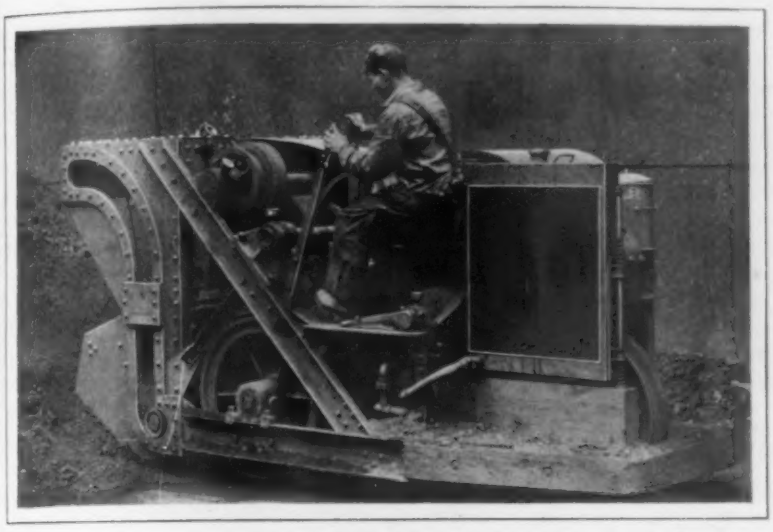
N. Y. PRICES—REPAIRS AND EXTRAS

Date	Cat'l. No.	DESCRIPTION AND SIZE — Fred Cutter - Eclipse	N. Y. Order No.	Disc.	Boxing and Packing	Frt.	N. Y. Price
3/10/13	#610	#6 Shaft	4997				$2 30
"	" 14	#6 Grinder	"				1 75
"	" 22	L.H. Shafe Nut #6	"				10
10/1/13		All parts now listed for both sizes Cutters		20%			

Reverse of Card Which Is Used for Prices of Repair and Extra Parts

apparent saving may be more than offset by the extra cost of knocking down the various parts so that they will pack closely in the cases.

The record of export prices must of course be kept up to date. Our record of a quotation is made in red ink the same day the quotation is sent. The first order is recorded in black ink and no further entry is made until a new price has been quoted. New prices may be necessary for various reasons, a change in design, additional equipment which in the future will be a part of the standard machine, the call for a high-priced material in place of what has formerly been supplied, for instance, a vanadium steel shaft in place of an ordinary steel shaft, an excessive advance in the cost of the materials entering into the machine and which were figured on a considerably lower market, or the dropping off in the size of the specification, as 100 machines cannot be made as cheaply as 1000 or 10,000. Any of these may necessitate advancing the price. On the other hand, increased output, or the substitution of some other material which may cost less but be equally as good or better for the particular purpose than the material it takes the place of, may cause a revision of the prices downward.



A Power Shovel of the Scraper Type at Work in the Hold of an Ore Vessel Removing Material from Inaccessible Corners to the Hatch Where the Hoisting Bucket Can Pick Up a Full Load at Each Grab

In making up the cards all the various ways of furnishing the machine should be taken into consideration. To some parts of the world certain attachments are necessary, while these same parts elsewhere would not be used. Therefore, the complete record must include the various combinations. It is not good policy to destroy the older cards which may seem to have served their purpose. The writer has known of instances where a customer, who had not sent in any orders for a number of years, picks up the thread again and sends in a list of his requirements. The old card serves then to bring the export office in close touch with the previous orders. The dates and order numbers will serve to locate the proper correspondence and when the answer is sent to the customer it contains the information that he requires and not a request for further information. A duplicate set of cards should be kept in the export office; the records will be made from the same source, namely, the correspondence.

Mercury, which was quoted at San Francisco in July, 1914, at $37.50 per flask of 75 lb., is now selling at $90.

Power Scraper Shovel for Ore Boats

A power scraper shovel intended particularly for the cleaning up of ore and coal in the bottom of boats is being placed on the market by the Brown Hoisting Machinery Company, Cleveland, Ohio. It is designed also for handling material on docks that cannot be reached by dock machines and for handling various other materials in yards and on the floors of buildings. This machine was developed by S. J. Russell, superintendent of the Buffalo, Rochester & Pittsburgh Railroad Company's dock at Buffalo, N. Y., and was first used on that dock during the season of 1914. Various improvements were made on another shovel that was built for the season of 1915 and further improvements have been made as a result of the experience with the two machines.

The power scraper shovel consists of a high power gasoline engine operating a raisable shovel located at the front of the machine. When the shovel is raised as far as it will go, it is turned over in a dumping position and the load discharged. The machine is mounted on two rubber tired driving wheels, and a third wheel at the rear which serves as a trailer and steering wheel. The two driving wheels are connected to the engine by gears and clutches. The hoisting drums for raising the shovel and dumping it are also connected to the engine in the same way. The operations are controlled by levers located in front of the operator's seat. Brakes are supplied to give better control of the operations. The machine is approximately 12 ft. long, 5 ft. wide and 6 ft. high. The width of the shovel is approximately 4½ ft.

In unloading cargoes of ore and coal a certain amount of material that lies between the hatches cannot be reached by the unloading buckets. The shovel is used to place this beneath the hatch openings, thereby doing away with the hand shovelers. The use of the shovel to keep enough material beneath the hatch opening permits the unloading bucket to get a full load at each grab and the time of unloading the boat is reduced. When possible the shovel pushes the material to the desired point, making the handling more rapid than if it were necessary to carry a shovelful at a time. However, when working in the bow or stern of the boat or against bulkheads it is necessary to carry the material to the hatch a shovelful at a time. To save time in unloading the shovel is also used for delivering material from two to three hatches to one opening from which the ore is being taken by the grab bucket. The machine can be quickly let down into the bottom of the boat by the ore handling equipment and is quickly taken out when the entire cargo has been removed.

The advantages claimed for the shovel are speed and economy. It is said that with its use a boat can be released from the unloading dock in from 1 to 5 hr. sooner than when hand shovelers are used and that it saves cost of from two to forty shovelers, depending on the type of boat. The saving in time and labor is indicated by various records that have been made. One of these was in the unloading of the steamer W. J. Mather in 2 hr. less time with two shovels and two laborers, than without the use

of the power shovels, when thirty-nine laborers were required for shoveling. In taking the ore from the bow of the boat and delivering it to the hatch the shovel has moved 100 tons in 45 min. or approximately in 2 hr. less than was required to do this same work with hand shovelers.

SAFETY IN CRANE CHAINS*

New Table of Working Loads Needed—Annealing Relatively Unimportant

One can readily obtain from most any handbook a table of so-called safe loads for chains, but the peculiar thing about these recommended safe loads is that when put to actual practice, the chains are not safe, but fail, and fail frequently, hazarding the lives of the many workmen over whose heads the supported loads are carried back and forth. Some of the failures are sudden and occur under a loading seldom equal to and more often far less than the recommended loading. Furthermore, an examination of these "pop" failures reveals that they are seldom due to a bad or burnt weld, or to a section of the link that has been weakened by wear or abrasion, but generally shows that they are due to a so-called crystallized link.

FAILURES NOT PREVENTED BY ANNEALING

After quite an extended study of failures due to a crystallized link, the writer has concluded that they are due to imposed stresses equal to and in excess of the elastic limit, and in this brief discussion will attempt to show that the crystallized link is undoubtedly due to overloading and cannot be prevented by annealing.

The term crystallization is undoubtedly a misnomer, as all steel and iron are originally crystalline in structure. What really takes place is that the working of the metal beyond the elastic limit simply breaks down the long fibers or granulates them as it were. It is simply a condition of fatigue. The characteristic hardening or brittleness of the metal in this condition is undoubtedly due to the heat which is set up internally by the slippage of the fibers.

BREAKING TEST OF CHAIN NOT A BASIS

The writer is firmly convinced that the proper safe load should be based upon a permissible working stress for the extreme fiber, and not on the ultimate breaking strength test of the chain. This necessitates the solution of the maximum extreme fiber stress that is developed in an elliptical shape which is the usual shape of a chain link. This involves a theory which has received very meager attention in technical works. There seems to have been only one attempt to develop a formula for the fiber stress developed in an elliptical ring based on experiment and good sound theory. I refer to a thesis on the strength of chain links made at University of Illinois Experimental Station in 1907, in which the following formula has been developed for open links. This formula can be readily derived by applying the theory of flexure in curved shapes.

$$f = \frac{P}{0.4d^2}$$

Where f = extreme fiber stress in tension.
d = diameter of the stock used in link.
P = load on the chain.

In a recent bulletin on safe loads issued by the National Safety Council, the subjoined safe loads for straight suspension for wrought iron handmade short link chain are recommended. The writer has found by actual experimental tests that these values are on an average of about one-seventh of the ultimate breaking strength, and are in fact a trifle lower than the loads imposed in general practice in most plants.

Size	Safe Load
½ in.	2,400 lb.
⅝ in.	4,000 lb.
¾ in.	5,500 lb.
⅞ in.	7,500 lb.
1 in.	9,500 lb.

With these recommended safe loads the following stresses in the extreme fiber are developed by using the formula as cited above.

½ in.	24,000 lb. per sq. in.
⅝ in.	25,600 lb. per sq. in.
¾ in.	24,500 lb. per sq. in.
⅞ in.	25,000 lb. per sq. in.
1 in.	23,700 lb. per sq. in.

This means that the extreme fiber will be stressed up to and in excess of the elastic limit in the case of an iron chain, as the writer has made repeated tensile tests on Norway or Swedish iron, which is about as pure as any commercial iron obtainable, and has never developed more than an average ultimate tensile strength of 44,000 lb. per square inch, and an average elastic limit (or drop of the beam) of 23,500 lb. per square inch. This shows how such loading as exhibited produces stresses in excess of the elastic limit, notwithstanding the fact that the impact stresses due to mechanical braking in lowering the hoisted load, which are no doubt very severe under certain conditions, have been neglected. It is evident this magnifies the danger in applying stresses which will destroy the resiliency of the metal. This is, without a doubt, the reason why chain links become brittle and fail. It is also the reason why the average user encountering such difficulties resorts to annealing as a remedy.

ANNEALING NOT INADVISABLE

There has been much said of late both pro and con concerning the annealing of chains for restoring the metal from the so-called crystallized condition to the original physical properties. No doubt this annealing is a good thing in that it often forestalls failure, not because the metal has been completely restored to its original qualities, but because it has simply been made tougher. The writer has made several experiments on sections of metal taken from crystallized links, trying to find out whether annealing really does completely restore the metal. A series of four tests was made in each of the following cases:

A test bar was prepared from a piece of original stock of Norway iron, which was used in making up several chains. These chains were put in service and subjected to loading in accordance with the tables recommended in handbooks, and after a short time became fatigued and failed. Two test bars were prepared from each side of the failed link, one bar being left in the fatigued condition and the other annealed to a temperature of 1500 deg. F. These specimens were tested in a tensile machine with the following results. The figures exhibited are an average of four tests in each case.

Specimen	Elastic Limit (Drop of Beam)	Ultimate Tensile Strength	Per Cent Elongation	Reduction of Area	Fracture
Original stock	25,600	41,500	48.5	78.4	Cup
Fatigued, not annealed	38,700	46,900	29.0	74.6	Irregular
Fatigued, annealed	30,000	44,300	47.0	78.3	¾ cup

The chemical analysis of the original stock showed carbon, trace; phosphorus, 0.029 per cent; sulphur, 0.006 per cent; manganese, trace; silicon, trace.

*From a paper presented at the National Safety Council Congress, Philadelphia, Oct. 19, by Earl B. Morgan, safety engineer, Commonwealth Steel Company, St. Louis.

A careful examination of the above test data will show that the annealing did not completely restore the original physical qualities of the iron. The writer does not feel that annealing is inadvisable, but is firmly convinced that annealing is not the cure for fatigue. Annealing chains is certainly a good additional safety factor in that it softens the metal and does away with the dangers of a brittle link. But the fact still remains that an annealed chain will undoubtedly fatigue if overloaded, so we are not going to have maximum safety in chain practice by all the proper annealing.

IDEAS OF SAFE LOADS NEED REVISION

What must be done is to revise the present code of so-called safe loads and base them on the rational basis of the permissible extreme fiber stress of the material used. It is going to be hard to remedy this overloading of chains, as a big misunderstanding has taken deep hold of the average mechanic and user of chains. To convince an old shop hand that a ⅝-in. iron chain should be only worked to 1600 lb. in straight tension when he has been using it to about 5000 lb. is indeed a hard proposition, as he feels it is perfectly safe because the chain has carried the load numerous times without failure.

RECOMMENDATIONS

In summarizing the writer feels that the following points should be closely observed to procure maximum safe conditions in crane chain practice:

1. Decide upon material desired, low-carbon open-hearth steel or an iron as nearly free from impurities as possible. A pure iron, I believe, is preferable to steel as it makes a better weld than steel, and also an iron link will stretch out to a lock more easily if overloaded, which serves as a telltale for inspection.

2. Prepare a rigid set of specifications covering the material, workmanship, and tests desired.

3. Insist on a handmade link, as the machine made link is bent cold around less than twice its own diameter at a high speed on an elliptical mandrel. This sets up severe initial internal stresses in tension and compression in the outer and inner fiber of the link respectively. The handmade link is made under a cherry red heat and obviates such stresses; also a far better lap weld is secured in a handmade link.

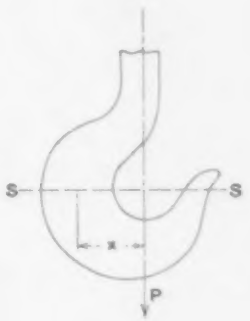
4. Number each chain and keep a record of when it goes into service and length of service and class of work it is used for. Inspection should be made daily by a competent and experienced person to detect any reduction of section due to wear, deformation of links and any visible flaws developed in the welds. This is somewhat tedious and expensive, but must be done and done carefully to insure safe operation. A fatigued link has a characteristic metallic ring when struck a sharp blow with a hammer, while a good piece of Norway iron has a decided dull sound when so struck. The writer has found that rings so detected by a metallic ring can be further tested by placing the link edgewise on an anvil and striking it several sharp blows with a sledge. If it is fatigued it will break with a decided crystalline fracture.

5. Special attention should be given to the design of the ring that connects the chain to the block hook. This ring should be designed to withstand the same load as the chain, using the regular formula for a circular ring under tension in a diametral line.

6. It is advisable to check up the size of the hook, as the writer has found the usual practice of designing a hook is to use the following empirical formula:

$$f = \frac{P}{A} + \frac{Px}{S}$$

Where S = area of critical section SS



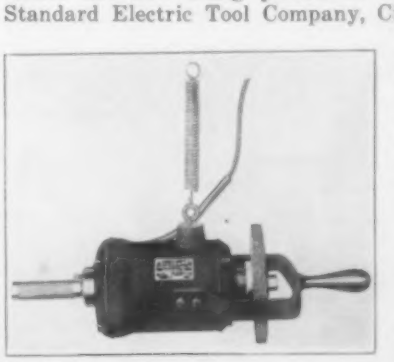
This formula is in error in that the second term represents the bending stress calculated from the formula used for straight beams, which, however, does not apply to curved pieces, and the formula given above is not even approximately correct. The correct stress caused by the bending moment can be solved by consulting any standard work on strength of material. The writer has also found many operations where it is necessary to suspend the load on the point of the hook. If there is any possibility of such practice, the hook should be designed accordingly, otherwise the stresses produced will be dangerous.

7. The last but most important recommendation is: To subject the chains to a proper load and as an additional safety precaution, anneal them before they are put in service. This annealing though will not prevent fatigue of the metal in case the chains are overloaded, but will merely soften the chains so they will pull to a lock and serve as a telltale for overloading.

It is obvious from the foregoing discussion on the causes of fatigue that annealing at regular intervals is entirely unnecessary, as, if there is any benefit from annealing at all, it will be merely to toughen the metal, and therefore is only necessary once.

An Aerial Electric Grinding Machine

Two types of new pedestal and aerial grinding machines are now being placed on the market by the Standard Electric Tool Company, Cincinnati, Ohio.



An Aerial Motor-Driven Machine for Grinding Rough Castings or Buffing, Which is Suspended from the Ceiling by Springs or from a Traveling Crane by a Pulley and Counterbalance

The pedestal type is made in ½ and 1 hp. capacities, with wheels ¾ x 8 in. and 1 x 10 in. respectively. These tools can also be used for buffing, as well as grinding tools and castings. Ball bearings are employed throughout, the double-row, self-aligning type being used. These are incased in grease in dust-proof chambers. All motors are impregnated in Bakelite. This tool is claimed to be a great labor and time saver in any factory. It can be moved and quickly placed in operation in any department. It operates on a lamp socket and is furnished for either alternating or direct current.

The aerial grinder is built in ½ and 1 hp. capacities for direct or alternating current of either 110 or 220 volts. The tool is especially adapted for grinding rough castings or buffing. It can be suspended from ceiling by springs, or it can be suspended on a traveler by a counterbalance and pulley.

The grinder is also ball bearing, the double row, self-aligning type being used. The ½-hp. size carries an emery wheel 8 in. in diameter with a ¾-in. face. The 1-hp. size drives a wheel 10 in. in diameter with a 1-in. face.

A Uniform Basis for Figuring Foundry Costs*

Outline of a System to Give Accurate Costs on All Classes of Work—Uniform Theories, Not Uniform Methods, Essential

It is evident that competing foundries in the same locality pay approximately the same price for

a.—Material.
b.—Labor.
c.—Same production (depending upon management and equipment).
d.—Same sales and clerical (nearly).
e.—Same rent, interest, taxes, insurance (approximately).
f.—But they do not follow the same method of computing or grouping the foregoing.

It is not difficult to ascertain accurately the total monthly and annual costs of

a.—Metals.
b.—Materials.
c.—Labor.
d.—Expenses (or commonly referred to as overhead charges).

It follows then that four fundamental requirements must be considered:

a.—Accurate payroll distribution.
b.—Accurate stores (material disbursements, covering only the month's actual consumption—not receipts).
c.—Accurate bookkeeping.
d.—Production in net tons of good castings to ascertain the proper divisor for all amounts obtained from the foregoing.

The problem of greatest difficulty is to find the proper differential of overhead costs, or rather the proper method of distributing the overhead to the various departments and patterns. It will be conceded that a different overhead is to be applied to almost each and every job and briefly stated, a fast-moving job should not bear as great an overhead as one that is slow-moving.

Many ways in which the overhead charges are figured might be mentioned, but it has been decided to recommend what might be termed "the-tonnage-per-day-per-man plan."

TONNAGE-PER-DAY-PER-MAN PLAN

One reason for adopting this plan is that almost every foundry can turn to its past records for a year or several years and establish an average per day per man that has been molded during this period. Also, the number of molders hours for a similar period can be ascertained. Then ascertain if the average man produces 100, 500, 1000 lb. per day, or whatever amount this may be, and the standard of the plant thus is secured to start with. It will not be difficult to obtain the total amount of expenses or overhead charges for the same period as covered by the tonnage per man, as almost any system of bookkeeping will show this. Dividing this total by the total tonnage produced during this same period and the average overhead expense per ton or per pound, as well as the average production per molder, will be obtained.

The overhead is based entirely on the labor of the molder and coremaker, eliminating cleaning room labor, etc., which might be included, but which will not be taken into consideration at this time as cleaning costs, etc., will be taken care of subsequently.

VARIABLE DISTRIBUTION OF OVERHEAD

It will be assumed that two standards have been obtained, namely, the tonnage or pounds per man and the overhead per pound. Suppose that the tonnage per molder per day, or the average output per day per man, is 500 lb. and that the overhead expense per ton is $10, or ½ cent per pound. If the job is of the average molding type, one which can be produced at the average of 500 lb., the average cost applies. If, on the other hand, the job is of light weight, difficult or slow to mold and only 250 lb. is obtained per day, the overhead would be about twice as much as when the output was 500 lb., or 1 cent per pound in place of the standard or average of ½ cent per pound. It then is necessary to add to the average cost not only the cost of extra molding, but the ½ cent additional overhead cost. It is apparent that if the foundry is operated on this slow-moving class of work entirely, the yearly tonnage would be about one-half of the average. The expenses would be about the same and, therefore, the costs for conducting the business would be twice as much per ton as on average jobs. Unfortunately, most foundrymen fail to add the ½ cent increase for overhead, although they may be laboring under the delusion that they are adding it under the extra cost of molding.

Let us consider another job in which the reverse condition applies. This can be molded at the rate of 1000 lb. per day per man and the tonnage produced, therefore, will be twice the average of 500 lb. The overhead expense per ton then will decline about one-half; let us assume that it is 50 per cent. From the average cost should be deducted the amount saved in molding and also one-half of the overhead cost, or $5 per ton. The amount chargeable for overhead will then be ¼ cent per pound. On this class of work the tonnage per year would be double and with the overhead expenses practically constant, it is apparent that the overhead per ton would be only one-half of the previous average overhead. In competing for business the foundryman who does not take into consideration the variables cited will not get the order and only too frequently will he complain that his competitor did not know his costs and obtained the work at ruinous prices. It follows then that the foundryman, without an adequate cost system, readily secures all the difficult work on which no profit can be realized, as his price is liable to be lower than that of his competitor on this class of work, whereas he is not favored with the better class of work or the rapidly moving jobs owing to his failure to consider the variable overhead. This condition will prevail regardless of the fact that this foundryman may be able to produce castings as economically as his competitor.

VARIABLE AND CONSTANT OVERHEAD

To define more clearly the results obtained by figuring on a variable overhead and a constant overhead, we may cite the following examples: It will be assumed that the overhead cost per molder, or floor, is $2 per day. Two jobs are accepted; on

*Report substantially in full, of the Cost Committee of the American Foundrymen's Association, presented at its meeting at Atlantic City Sept. 28, 1915. The personnel of the committee is as follows: Benjamin D. Fuller, Westinghouse Electric & Mfg. Company, Cleveland, chairman; H. J. Koch, Fort Pitt Steel Castings Company, McKeesport, Pa.; Harrington Emerson, president Emerson Company, New York; E. G. Felthausen, and H. O. Lange, Ferguson & Lange Foundry Company, Chicago.

the one the output is 200 lb. per day and the other, 1000 lb. per day. It will be assumed that on both jobs the molder receives $3.50 per day. The following roughly illustrates the method of estimating or calculating the costs recommended:

	Production Per Day, Per Man, 200 Lb.	Production Per Day, Per Man, 1000 Lb.
Direct cost (molder one day at $3.50)	$3.50	$3.50
Other constant costs at 85 cents per cwt.	1.70	8.50
Assumed average overhead per molder or floor	2.00	2.00
Total cost	$7.20	$14.00
Actual cost per pound	0.036	0.014

If these two tasks had been figured in the old manner of distributing costs, except direct cost for molding, we would obtain the following results:

	Lb.	Lb.
Castings, Weight	200	1000
Direct cost	$3.50	$3.50
Average constant cost, assumed average overhead cost per pound at 1.183	2.37	11.83
Total cost	$5.87	$15.33
Assumed cost per pound	0.0293	0.0153

The slow-moving job, by the old method of figuring, would take a lower price than the slowly moving job by this method of estimating. On the contrary, the rapidly moving job, involving 1000 lb. of castings, would be charged for at a higher rate by the old method than by this plan, namely, 1.53 cents per pound, as compared with 1.4 cents per pound.

The effect of the proposed system is to load a higher cost on slowly moving jobs. It is believed that foundrymen generally have appreciated the necessity for this since it is evident that a shop which is compelled to operate on slow jobs does not turn out as many, nor does it get the returns that it would on jobs permitting a higher tonnage.

ASCERTAINING THE OPERATING COST

This report would not be complete without incorporating a recommendation for the adoption of a general form for ascertaining the annual or monthly operating cost, including the totals of the three following fundamentals:

a.—Metals consumed
b.—Material consumed.
c.—Labor and salaries.

These items can be subdivided and distributed over the different foundry departments according to the accompanying form as follows:

1.—Melting department.
2.—Molding and core department.
3.—Cleaning department.
a.—The total of these gives the producing total of metals, material and labor.
4.—Pattern department.
5.—Flask department.
6.—Power, light and heat.
7.—Repairs and maintenance.
8.—Yard.
b.—The total of all the foregoing shows the entire manufacturing cost.
9.—Rent account, including insurance, taxes, obsolescence or depreciation, and interest on plant account.
10.—Administrative or executive expense, including balance of interest, salaries, stationery, telephone, postage, etc.
11.—Sales department.
12.—Extraordinary charges.
c.—The total gives the general cost.
13.—Castings returned from customers.
d.—Grand total of the entire cost. The item of total dollars expended should check with the ledger.

This will give the general average cost for the tonnage produced and can be used as the cost standard if the principal differentials are added or subtracted. It also can be employed in the nature of a check on the results of each foreman from month to month or what is termed "the control or comparative cost." In the foregoing subdivisions is included the item of extraordinary charges. This is separately indicated to eliminate from the preceding departments any unusual charges which would not be constant and would otherwise affect the control cost or prove to be unreasonable charges against a certain department for the month.

VOUCHER SYSTEM RECOMMENDED

To obtain this result the use of a voucher system is recommended. It also is essential to have an accurate payroll distribution for each department, and it is necessary to make a detailed distribution and accounting of all materials used. It is necessary to ascertain the accurate tonnage produced by weighing the castings or estimating such castings as cannot be weighed in bulk in the cleaning room on the first of each month, or any other period decided upon, and to add the increase or subtract the decrease from the month's shipments.

Production 500 Tons

		Metal		Materials		Labor		Total	
		Total	Per Ton	Total	Per Ton	Total	Per Ton	Total	Per Ton
	1. Melting	$850.00	$1.70	$1,000.00	$2.00	$1,300.00	$2.60	$3,150.00	$6.30
	2. Molding and Cores			1,375.00	2.75	(Direct 500.00 / Ind. 2,300.00)	10.00 / 5.60	4,175.00	17.85
	3. Cleaning			1,000.00	2.00	(Ind. 4,000.00)	8.00	5,000.00	10.00
Manufacturing Overheads	a. Producing Total	850.00	1.70	3,375.00	6.75	12,800.00	25.60	24,675.00	49.35
	4. Pattern			1,500.00	3.00	2,250.00	4.50	3,750.00	7.50
	5. Flasks			2,750.00	5.50	1,000.00	2.00	3,750.00	7.50
	6. Power, Light, Heat			550.00	1.10	2,500.00	5.00	8,000.00	1.60
	7. Repairs, Maintenance			265.00	.53	4,000.00	8.00	665.00	1.33
	8. Yard			250.00	.05	4,000.00	8.00	4,250.00	8.50
	b. Manufacturing Total	850.00	1.70	4,640.00	9.28	14,175.00	28.35	27,315.00	54.63
Executive Overheads	9. Rent Account			600.00	1.20				1.20
	10. Administration			1,000.00	2.00	2,050.00	4.10	3,050.00	6.10
	11. Sales			1,000.00	2.00	3,250.00	6.50	4,250.00	8.50
Other Overheads	12. Extraordinary Charges			400.00	.80	600.00	1.20	1,000.00	2.00
	c. Total Cost	$850.00	$1.70	$6,740.00	$13.48	$17,150.00	$34.30	$32,390.00	$64.78
	13. Returned Castings							260.00	.52
	d. Grand Total							$32,650.00	$65.30

Form for Ascertaining Annual or Monthly Operating Cost

The amount produced is used as the divisor of the amount charged to each department and also the total value charged to all departments, according to the amounts shown by the voucher record or ledger. If this production divisor is not correct, it throws out the cost for the month and the succeeding month.

The accompanying chart is compiled on an assumed production of 500 tons per month and it will be noted that it records the amounts charged to each department and the cost per ton of material and labor and the total cost per ton for each department. While the foregoing gives the average of one month only, it is necessary to obtain averages covering periods of one, two or as many years as desired to obtain an average that will cover a period of trade depression and periods of prosperity. In explaining the methods by which the average is obtained the figures on the accompanying chart will be referred to. It is essential to ascertain the average remelt, especially that of heads and gates, so that if an order takes a large head the proper differential should be added to the standard average cost of $65.30.

VARIATIONS IN SHIPMENT AND MELT

At this point it might be advisable to direct at-

tention to the wide fluctuation in the percentage of castings shipped and the total melt in various shops and for different classes of work. This variation, while being greatest in steel casting work, also is a factor of importance in iron foundry practice. One large manufacturer operates two iron foundries, one on light and the other on heavy work. The output of the light foundry averages 5 lb. per casting, while the output of the heavy work shop averages 125 lb. The proportion of shipments to melt of the light shop is 55 per cent, while that of the heavy shop is 70 per cent.

METHOD OF CALCULATING COST

After having obtained the total average cost of $65.30, subtract the amount of direct or productive molders' and coremakers' labor, which is $10, leaving a total of $55.30. After ascertaining the direct or producing molding and core labor per ton for a job which is not exactly the average, namely $10 per ton, add to this the sum of $55.30. In other words, $55.30 is the starting point for all costs and

EXAMPLES FOR APPLICATION OF FIRST THEORY

To apply the first theory referred to, the following examples are cited:

If the job is strictly of an average type costing $10 for direct molding and core labor, the total cost will be $65.30. If the job is slowly moving, add to the standard average cost of $55.30 the proper amount of overhead. If the castings cost $20 for direct molding and core labor, which is double the average of $10, they carry $30 overhead, or twice the average of $15, which results in $55.30 plus molding and core labor, plus $15 extra overhead, and equals $90.30.

If rapidly moving, and the castings cost only $5 for direct molding and core labor, they carry an overhead of only $7.50, or one-half of the $15 average. Therefore, to the $55.30 standard average cost we add $5 for molding and core labor, which equals $60.30 and from which we subtract $7.50 for reduced overhead, and we arrive at a total cost of $52.80.

In this connection, it is interesting to direct attention to the wide fluctuations in the cost of fast and slow-moving as compared with the average job. The average job in this case is represented by $65.30; the fast-moving job at $52.80 and the slow-moving job at $90.30.

The proper variations can be figured for every $1 per ton above or below the average molding and core labor cost of $10. For all practical purposes a variation of $2.50 per ton, or ⅛ cent per pound, will be sufficient. The result of the cost obtained on any particular pattern will not vary widely from that secured by a more elaborate system which is difficult to understand and frequently so burdensome that it will not receive the hearty co-operation and support of the heads of the operating department.

INSTRUCTIONS FOR OBTAINING PROPER COST

With the foregoing examples, the following simple instructions will aid in arriving at the proper costs. On the accompanying chart the grand total is given at $65.30.

Add or subtract for heads and gates above or below the average or standard.

Add or subtract the difference between the specific and the standard direct molding and core labor cost.

Add or subtract the difference between the specific and the standard or average cleaning cost.

Add or subtract the difference between the specific and the standard, or average defectives.

Add or subtract the proper differential of overhead costs.

Recommendations of Committee

To promote the adoption of a uniform method of keeping costs among the members of the American Foundrymen's Association and the foundry industry at large, the employment of a cost accountant is recommended who is in thorough harmony and sympathy with the methods outlined. Ways and means for meeting this expenditure is the subject for the consideration of your executive committee, but as a suggestion, it is recommended that 100 foundrymen guarantee a fund by the payment of $50 each, or 50 foundrymen guarantee to pay $100 each for a period of one year. Each of these foundrymen then would have first call on the services of this cost expert and during the year he could remain at each of their plants a sufficient time to teach the accountants the basis or theory of the system recommended.

Also, general meetings could be held in the various localities which the cost accountant visits and the system further explained so that more foundry competitors would be interested in the adoption of the uniform cost theory. In making these suggestions it is realized, of course, that the association has not sufficient funds to defray the cost of an expert's services, nor would it be fair to the membership at large to employ such an expert for the benefit of the comparatively few whose plants he could visit within a year. Therefore, the plan has been devised of underwriting a fund to defray the cost of the expert's services and his expenses.

possibly might be termed "zero labor" or the cost of castings exclusive of the molding expense.

Since the cleaning cost was not included in the direct or productive labor on which the overhead was based, it will be taken care of as follows: According to the accompanying chart the average cleaning cost is $8. If the casting is difficult to clean, the cost will exceed this amount and if it is below the average in cleaning expense, it will be less than the average of $8. This difference should be added to or subtracted from the average cost of $55.30. It is not difficult to ascertain for any casting whether it is more or less expensive than the average pattern to remove the heads and gates, or to judge whether it takes more or less grinding, chipping, etc., than the average. Large heads, excessive core work, etc., as a rule, mean high cleaning costs. From experience one can readily determine whether the cost should be increased or decreased as a result of abnormal or subnormal cleaning of any design.

Next, ascertain the average of the defective castings made in the foundry. Then add to or subtract from $55.30 an amount covering these defectives which may be estimated, or is shown by the records as applying to the particular pattern in question.

It may be approximately assumed that items Nos. 4 to 11 on the accompanying chart make up the overhead expenses. The cost per ton will vary more or less with the production, but the total amount charged against these departments will remain fairly constant. Therefore, the average overhead per ton is readily obtained and is shown to be $15.43, or approximately ¾ cent per pound.

Add contingencies, extra flasks, pattern changes, etc.

By following these instructions the total cost of a casting of any pattern can be obtained.

In carrying out this system, it is by no means necessary to obtain costs on all small orders, job lots, etc. However, large orders can easily be estimated, followed through the shop and checked and can be properly priced as a basis for an estimate for the next inquiry.

Another feature of this method is that to-day it can be applied on any order made months ago, provided the number of castings molded per day, as well as the weight of such castings, has been recorded.

It is not necessary to tabulate the cost of every order, but the cost to-day, to-morrow or a year hence can be obtained if the records are filed indicating the output of each molder per day on the various patterns. In conclusion, it will be noted that the percentage theory has not been used for figuring the overhead, but rather the amount in dollars and cents, in the belief that this can be followed more satisfactorily by the heads of the operating departments without losing the support of the accountant.

In line with the foregoing theory, the profit should be figured in dollars per ton. Let it be assumed that the justified profit is $2 on an average tonnage per month of 100, or a total of $200. If the work going through the shop is slowly moving, notwithstanding the fact that every molder is employed, when only 50 tons are produced the profit should be $4 per ton, which equals the average of $200 per month. If, on the other hand, the work going through the shop is of the rapidly moving variety, so that the same number of molders produce twice the output of 200 tons, the profit could be reduced to $1 and yet make the average of $200 per month. The results by this method of computation are the same regardless of the class of work taken by the sales department.

MODERN ABRASIVES DESCRIBED

Philadelphia Foundrymen Hear Paper on Carborundum Company's Products

Of interest at the regular monthly meeting of the Philadelphia Foundrymen's Association, Nov. 3, was a paper on "Carborundum Products, Their Manufacture and Uses as Abrasives and Refractories," by C. E. Hawke of the Carborundum Company, Niagara Falls, N. Y. As an introduction to his paper, Mr. Hawke described the discovery of carborundum by Dr. Edward G. Acheson, its manufacture on a commercial basis, and the evolution of Aloxite, another abrasive manufactured by the company. The process of manufacturing Aloxite, Mr. Hawke described as follows:

METHOD OF MANUFACTURING ALOXITE

It is manufactured by fusing a highly aluminous ore in an electric arc furnace. The Carborundum Company's Aloxite plant is located in southern France, where the company has its own power installation developing 8300 hp. The location of this plant is within a short distance of the world's richest and greatest bauxite fields, which are found in the south of France and which cover an area 500 or 600 miles long and 50 miles wide.

An Aloxite furnace consists of a conical steel shell mounted on a movable base. The bottom of the furnace is covered with a layer of carbon to protect it from the heat generated in the furnace. The top of the furnace is open. Two heavy carbon electrodes, carried by adjustable heads, extend vertically into the furnace neck from above. A furnace operation consists in gradually adding a mixture of bauxite and coke to the furnace until it is completely filled and fused to within a few inches of the shell. During the furnace operation, the electrodes are gradually raised as the furnace is filled.

The metallic reductions products sink to the bottom of the furnace as the mix becomes fused. The temperature attained in this type of furnace is approximately 2000 deg. C.

When the furnace is filled, the current is shut off and the shell removed. The semi-fused materials are then separated from the ingot and returned to the furnace mix. The ingot is then allowed to cool and crystallize, after which it is broken up into small blocks. In this form it is packed ready for shipment to the Carborundum Company at Niagara Falls, where it is crushed, concentrated, chemically treated and graded in a similar manner to that employed in the treatment of carborundum. At the present time, the Carborundum Company is producing 1,500,000 lb. of Aloxite each month.

MIXING CARBORUNDUM FIRE SAND

Mr. Hawke also described the uses of carborundum fire sand, which will withstand temperatures up to 2240 deg. C. This material is largely used for linings of crucible furnaces, replacing the firebrick linings. A mixture of 70 per cent carborundum fire sand, 15 per cent ground clay (kaolin), 8 per cent silicate of soda and 7 per cent water is often used. In the preparation of the mixture, water and silicate of soda are first mixed and then added to the clay and fire sand. A plastic mixture results, which is easily molded and has sufficient cohesion when tamped into place to retain its shape until fired. In cold weather it is advisable to warm all the materials before they are used. Some variations from the above mixture are frequently used.

The Carborundum Company also manufactures two special grades of firebrick, known respectively as refrax and carbofrax, of which the speaker said:

FIREBRICKS WHICH CANNOT MELT

Refrax consists of recrystallized carborundum, and the bricks are made by mixing carborundum grain with furnace mix which is recrystallized in the hottest zone of the carborundum furnace. Such bricks cannot be melted, but will decompose at a temperature exceeding 2240 deg. C. Their use, however, is practically prohibitive for ordinary purposes, as such bricks of standard 9 x 4½ x 2½ in. cannot be sold under 60c. apiece. They are, however, frequently used for special purposes. As a support for the crucible in an ordinary crucible melting furnace, these bricks met with considerable favor. They have also been used in the construction of electric steel furnace crowns.

The use of carbofrax bricks is also practically prohibitive for ordinary purposes, as these bricks market for 50c. apiece. In the carbofrax brick, the carborundum is bonded with from 6 per cent upward of refractory clay. In a recent test, which was conducted with the object of determining the strength of such brick, it was found that at 1350 deg. C. the standard size brick would support 1000 lb. distributed over an area of 3 to 4 sq. in. and applied between 8 ft. centers.

Pennsylvania Welfare and Engineering Conference

The third annual Industrial and Public Welfare and Engineering Conference of Pennsylvania will be held at Harrisburg, Pa., Nov. 16 to 19. The conference is held under the auspices of the Engineering Society of Pennsylvania and the State governmental departments and will take up many problems dealing with engineering and industrial interests. Sessions will be held in the hall of the House of Representatives and an exhibit of machinery, railroad supplies, safety appliances, etc., will be given in the Harrisburg Railways Company's car barn from Nov. 15 to 19.

The Alabama Company, Birmingham, Ala., will expend $75,000 in relining and overhauling its blast furnace at Ironaton, and in additions to its coke oven plant.

WELDING AND CUTTING METALS

Present Practice in Use of Oxy-Acetylene and Oxy-Hydrogen Flames

Present practice in the use of the oxy-acetylene and oxy-hydrogen flame for welding and cutting formed the subject of a paper presented by H. R. Swartley, Jr., before the recent International Engineering Congress, under the title "High Temperature Flames in Metal Working." Mr. Swartley reviews the accomplishment of the process in the metal working industries, in part, as follows:

STRENGTH OF THE WELD

The strength of the joint produced by autogenous welding has been a fruitful source of discussion in the application of the process, and many contentions have been advanced as to the necessity of welds of highest tensile strength. It was early found that welds having a breaking strength equivalent to that of the metal itself could be produced, but the sacrifice of elongation and reduction of area materially lessened the apparent value of such welds.

Present practice is directed toward securing a weld of good tensile strength, as compared with the strength of the plate, with high ductility, since, thereby, the service conditions are better fulfilled. The growth in understanding of such requirements has resulted in the production of methods, which, combined with proper apparatus, may uniformly produce these results.

DEVELOPMENT IN WELDING TORCHES

European practice covers the use of the low-pressure acetylene generator and injector type of blow-pipe almost exclusively, the independent-pressure type of torch having shown little development, despite its well-known economy of operation. The introduction of the process, however, in this country was accompanied by the development of the medium-pressure positive-mixture torch, utilizing both gases under independent pressure, assuring, thereby, stability and quality of the flame, heretofore not produced by the injector form of construction.

The trend of development in welding torches shows a progressive adoption by the rapidly increasing number of manufacturers in this country, of a construction which admits the gases under independent pressures. A review of exceptional performances, particularly of welding of heavy sections, covers a period coincident with the inception and exploitation of the medium-pressure form of torch with the accompanying successful acetylene generator producing that gas under pressure.

It is a prime requisite of operations carried out in the constantly multiplying instances of heavy metal-section welding, that the work be carried on continuously, on account of possible failure due to shrinkage strains and similar causes. For operations of this character it will be noted that the medium-pressure positive-mixture form of blow-pipe is almost invariably employed, due to its ability to withstand the high pre-heat temperatures to which it is subjected during the performance of the work and to the better combustion obtained.

CUTTING WITH THE OXYGEN JET

The discovery that a jet of oxygen directed upon a previously heated steel or wrought-iron section was capable of burning the metal to iron oxide, and furnishing, thereby, a most convenient and effective means of cutting sections up to 30 in. in thickness, marked an epoch in the development of the world's metallurgical industry. It was early appreciated that, in order for oxygen metal-cutting apparatus to attain its recognized standard in metal-working fields, there were involved the factors of low-cost gas supply and minimum consumption of gases per square inch of metal oxidized.

With the establishment of oxygen-generating stations and distributing service, the first of these requirements has been met; for the second, the time and energy of apparatus manufacturers has been devoted to making it possible to substitute the oxygen cutting torch in a rapidly increasing number of instances, where, formerly, only most laborious and expensive methods were possible.

Recent notable instances are:

Armor-plate, 16 in. thick, cut at the rate of 4 lin. in. per minute—the oxidation of the steel being effected at the rate of more than 1 sq. in. per second.

Cutting gun port in armor-plate 18 in. thick. Time required 50 min., operation ordinarily requiring four weeks of drilling with subsequent two-weeks machining time.

Fifty-two lineal feet of gun-turret top, of armor-plate 5 in. thick, was cut at the rate of 8 lin. in. per minute, after which 48 lin. ft. of the edge of the plate was beveled at 15 deg. with the cutting torch, the entire cutting operation requiring 2 hr. 10½ min. It was estimated that by former methods of drilling and then beveling on a large lathe, four weeks' time would be required and a cost entailed of about $2,000. The cost of gases for cutting by the method employed was $54.38.

A 7500-ton cast-steel cylinder, representing a pouring of 140,000 lb., had five risers to be removed, one being 36 in. in diameter and weighing about 15 tons. The apparent difficulty of removing the risers was quickly overcome with the cutting torch, the 36-in. riser being cut in 1¼ hr.

These cutting operations were accomplished with mechanically guided torches employing oxygen with hydrogen as the fuel gas.

UNUSUAL APPLICATIONS OF AUTOGENOUS WELDING

As indicating the wide range of application of the process, manufacturers of jewelry employ autogenous welding for the joining of precious metals requiring for their successful manipulation the production of high-temperature flames equaling the size of a needle point, under most exact adjustment and control.

Autogenously welded tube and pipe sections have formed important parts of foreign-constructed machinery. Welded sheet-metal formations of exceedingly intricate character for many years puzzled the minds of American manufacturers, as to the method of production, until the application of autogenous welding provided a solution of the problem of duplication. It is interesting to note that there are now under construction in this country industrial establishments capable of producing autogenously welded tubing, by mechanical operation, in quantities sufficient to compete with modern tube mills employing the lap-welding methods and with seamless drawn tubing.

Announcement is made that the Peerless Truck & Motor Company has been organized to take over the business and plant of the Peerless Motor Car Company, Cleveland, Ohio, and the General Vehicle Company, Long Island City, N. Y. The latter company is controlled by the General Electric Company and it is reported that this company is an important factor in the new organization. The authorized capital of the new company is $20,000,000.

Pouring Systems for Gray-Iron Foundries

Devices Which Have Allowed for Lengthening Molding Time—Molten Metal Handled with Diminished Fatigue in Pouring

Fig. 1—Support for Pouring Ladle

POURING systems and devices which have come into existence in foundries to keep pace with the increasing mold-producing capacity of modern foundry equipment were discussed by H. Cole Estep, associate editor of *The Foundry*, in a paper presented before the recent Atlantic City meeting of the American Foundrymen's Association. The accompanying illustrations have been reproduced from the paper, which in explanation had the following to say:

Molding machines have now become so perfected that on many classes of work it is not difficult for a man to put up more molds between 7 a. m. and 3 p. m. than he can conveniently pour-off during the remainder of the working day. In many cases, this condition makes it necessary to operate the molding equipment at less than its capacity because of inadequate facilities for handling the molten metal.

In the comparatively few shops where complete pouring systems have been installed, the results have been exceedingly gratifying and the investment in pouring apparatus has been rapidly repaid. In one shop in Wisconsin the introduction of pouring devices is said to have made it possible to lengthen the molding period by over an hour each day, resulting in an increase in production of nearly 20 per cent, accompanied by a marked decrease in fatigue on the part of the men.

The fatigue element, the author emphasizes, should not be overlooked in considering the installation of a mechanical pouring system. State laws regarding hours and conditions of labor are becoming more stringent every year, and the foundryman who does everything he reasonably can to ameliorate the working conditions in his shop finds that he not only keeps on the safe side of legislative enactments, but usually, also, increases his profits owing to the more efficient work obtained from thoroughly satisfied employees.

In some of these foundries 100 tons of iron may be poured into three or four castings, but in foundries specializing in automobile work, agricultural implement castings, sewing machine or typewriter parts, pipe fittings, etc., the pouring problem is a very real one. In one of the large automobile shops in Detroit, for instance, an aggregate of 127.6 tons of iron per day is poured into 8945 molds, giving

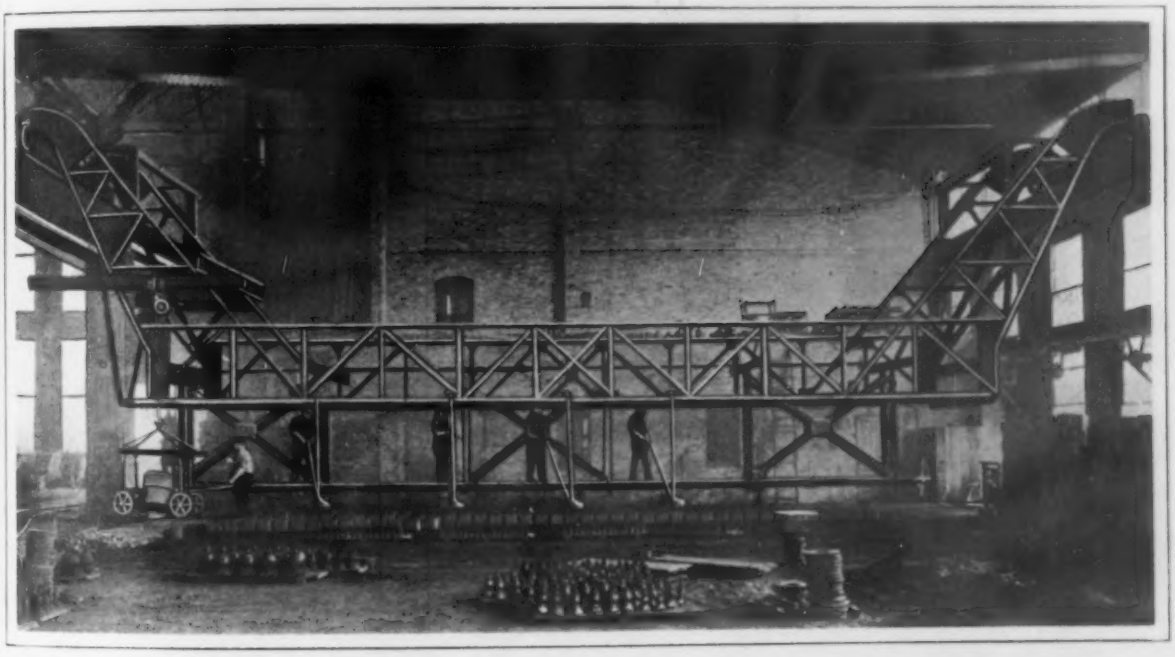


Fig. 3—Pouring Ladles Are Suspended from Trolleys on a Traveling Bridge

Fig. 2—Transferring Metal to Pouring Ladles

an average of only 28.6 lb. of iron for each mold.

An interesting pouring device designed particularly for gray-iron or malleable foundries turning out light castings is shown in Figs. 1 and 2. It was invented by Henry Ariens, president and general manager of the Brillion Iron Works, Brillion, Wis. Where this device is used, the iron is distributed to the various floors either by a trolley ladle or by some other means. Each floor or bay is equipped with a small, easily operated hand crane which runs across the shop at right angles to the distributing ladle track. The hand crane carries a small ladle from which the molds are poured. In most shops the cupolas are located near the middle and the distributing ladle, which is generally electrically driven, making alternate trips to each end of the molding room. Usually an operator rides with the distributing ladle and controls the filling of the small pouring ladles. The latter are handled entirely by the molders, who not only pour-off the floors, but in some shops shift their own weights and clean up the scraps of iron which may be spilled.

The hand crane which carries the pouring ladles may be of any convenient span up to 20 ft. At the Brillion shops these cranes have a span of 15 ft. and a height of 8 ft. from the floor. The latter figure could be increased to 12 ft. with safety. The hand crane consists of simple roller-bearing trolleys, between which a 5-in. I-beam is suspended.

The pouring ladle yoke is hung at the lower end of a 1¼-in. pipe, as indicated in Fig. 1. The ladle itself is carried in a bail, to the shaft of which the tilting lever is attached. The yoke slides over the suspension pipe and rests on a large cam which is held in position by a pawl. When the pawl is released, the yoke and ladle may be raised or lowered a distance of 10 in. by operating a lever connected to the cam. When receiving metal from the distributing ladle, the pouring ladle is brought to its lowest position and is afterward raised to any height convenient to the operator, within the range of the device. A sheet metal shield, which is secured to the yoke over the ladle, screens the molder's eyes from the intense glare of the hot iron. This results in more accurate pouring and fewer spills, thus reducing accidents and burns to a minimum. The men also appreciate the relief from eye strain.

When using this device, it is stated that one man easily pours 175 molds containing castings weighing 16 lb. each, including sprues. The total weight of metal poured by one man is, therefore, approximately 2800 lb. It is said an even greater number of smaller flasks can be poured, and under favorable conditions the records given above may be improved upon.

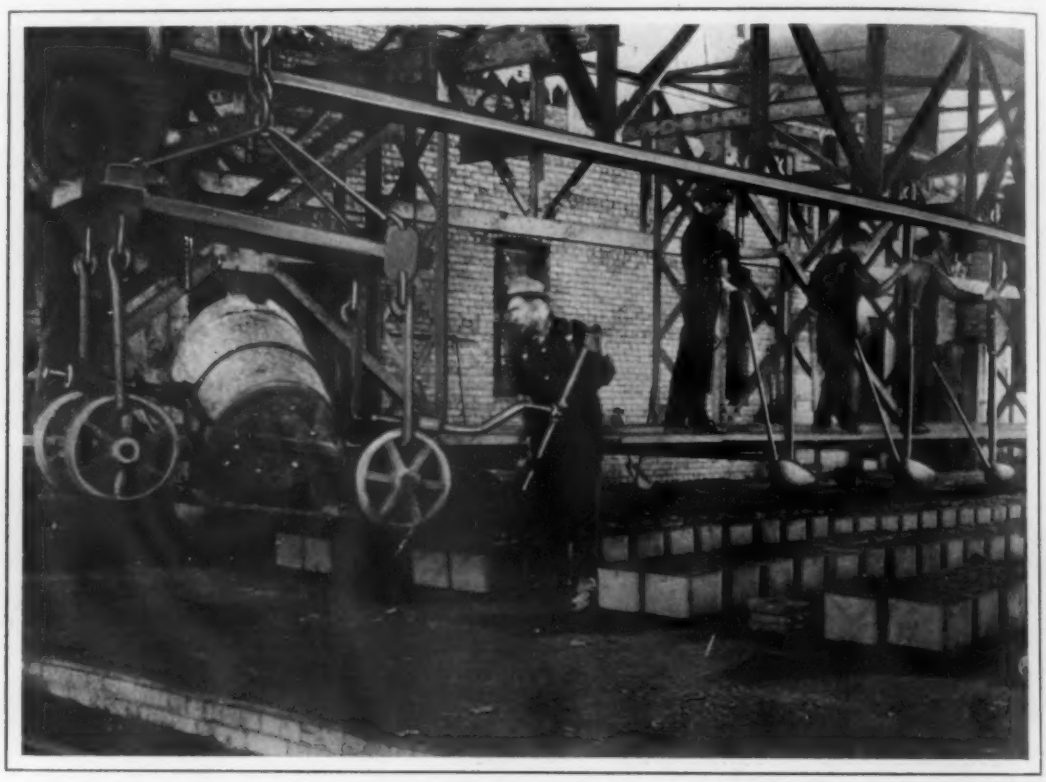


Fig. 4—The Pouring Ladles Are Filled from a Buggy Ladle in the Manner Shown and the Men Walk Around the Bridge Platform, Pouring on the Way Out and Returning on Other Side for a Fresh Supply

Owing to the fact that the distributing ladle usually is so operated that it makes alternate trips to each end of the shop, the men have ample time to shift their weights and rest during the pouring period. The distributing ladle may be of any convenient size. Usually it carries 2000 lb. of iron, the small pouring ladles having varying capacities up to 300 lb. The molds are poured in rows commencing with the one farthest from the distributing ladle.

In a series of observations made at the Brillion plant on Feb. 12, 1914, it was found that a green molder poured seven flasks containing 15-in. clod crusher plate castings in 160 sec. The total weight of metal handled in this time was approximately 90 lb. About 25 sec. were required to fill the ladle and shift the hand crane to the proper point for pouring; 65 sec. were absorbed by the pouring operation itself, and 70 sec. more in shifting weights and returning the pouring device to the distributing ladle. It is stated that when pouring by hand the men were able to carry enough iron to fill only three molds at a time and that a helper was necessary to shift the weights. It will be noted that the molder is relieved of all of the heavy labor of pouring.

The distributing ladle at the Brillion plant is suspended from an electrically-driven I-beam trolley, and is steadied at the bottom by a trailing wheel. A 9-in. I-beam is used and a 2000-lb. gear-tilted ladle

s carried. The machine is driven by a 4-hp. reversing motor.

Another pouring device, somewhat similar to the one just described, is employed in the shop of the King Sewing Machine Company, Buffalo, N. Y. It consists simply of a suitable trolley to which a suspension rod leading to the ladle yoke is attached. The suspension rod is provided with a turnbuckle so that the height of the ladle may be adjusted. The ladle yoke is carried by a ratchet lever which is used to adjust the ladle to the exact height required after the approximate height has been fixed by the turnbuckle. This device is used either with 250-lb. or 500-lb. ladles.

An exceedingly interesting pouring device suitable for shops having a large amount of small repetition work is shown in Figs. 3, 4 and 5. Its essential feature is a traveling bridge which is suspended from the main crane runway. This bridge, therefore, commands the entire molding floor and the metal is poured from small ladles which are suspended from light hand trolleys running on a track secured to the lower truss chords. The bridge also carries a platform on which the men controlling the pouring ladles walk. The pouring ladles are suspended by means of a chain link which permits of tilting them in any direction; the ladle also is securely fixed to a long tilting handle or shank, which is controlled by the workman.

The small pouring ladles are filled from a buggy ladle shown at the left in Fig. 4. When the device is in operation, the men fill their pouring ladles from the buggy ladle and walk out on the bridge to the molds which are to be poured. The trolley track is looped, and as soon as the molds are poured the workmen return with their empty ladles to the point where the buggy ladle is located. The men, therefore, walk completely around the platform under the bridge, pouring the molds rapidly. As each row is poured, the bridge is advanced to the next row. A special hoist is provided which lifts the buggy ladle bodily off the floor for filling the pouring ladles.

The buggy ladles are transferred from the cupola to the pouring bridge by the electrically driven car shown in Fig. 5. The cupola is provided with a double-lip pouring trough which is mounted on trunnions and may be tilted in either direction. Two buggy ladles are usually placed under each trough so that when one is full the work of filling the other may commence immediately.

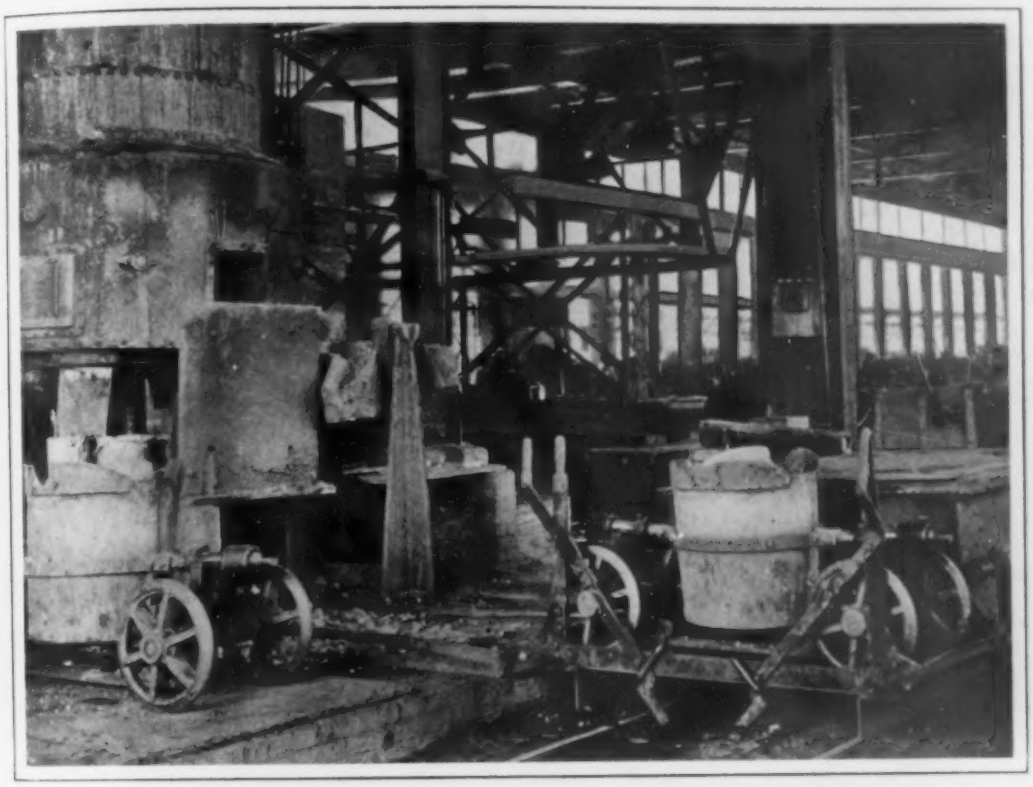


Fig. 5—The Buggy Ladles Are Transferred from Cupola to Pouring Bridge by Means of an Electrically Driven Car and the Cupola Pouring Trough May Be Tilted to Fill Either of Two Ladles at the Cupola

Rapid Unloading of Coal

Some fast unloading records were made the past season by the new Brownhoist coal tipples on the Hocking Valley Railroad docks, Toledo, Ohio. One record in the unloading of 777 cars with an average of 50.4 tons per car in 21½ hr., or an average of 36.1 cars or 1820 tons per hour. At another time 695 cars, with an average of 47½ tons per car, were unloaded at an average rate of 38 cars per hour. On the same day a steamer was loaded in 6 hr. and 5 min. with a cargo of 11,900 tons, or an average of 1950 tons per hour. This time includes the time from which loading was started until the boat had cleared the dock. This makes an average for each machine of 39.12 50-ton cars per hour. The above records are with both machines working and the hourly averages are for one machine. For short periods of time the two machines have made better records. As high as 60 cars per hour have been loaded by each machine for a period of 1½ hr., or on an average of 1 car per minute.

"The Coking of Coal at Low Temperatures with Special Reference to the Properties and Composition of the Products" is the title of Bulletin No. 79, by S. W. Parr and H. L. Olin, issued by the engineering experiment station of the University of Illinois. It is a continuation of the work presented in Bulletin No. 60. Coke resulting from the low temperature process contains from 18 to 22 per cent of volatile matter, but retains none of the tar-forming constituents. It kindles readily and burns with a bright, smokeless flame. Results of the research show that the coke, tar and gas have specific properties of special value and indicate that the process of coking at low temperatures could be established successfully on a commercial basis.

The Hardening of High Speed Tool Steel

The Function of Chromium and Tungsten —Importance of Secondary Low Heat Treatment—Permanent Magnet Steels

An important paper before the September meeting of the Iron and Steel Institute in London was presented by Prof. C. A. Edwards and H. Kikkawa, of Manchester University, on "The Effect of Chromium and Tungsten upon the Hardening and Tempering of High Speed Tool Steel." Many valuable practical points were brought out by the paper and the discussions, though the length and the highly technical nature of the paper preclude anything but a brief abstract, together with some of the discussion.

The authors consider that their experiments render it possible to offer a rational explanation of the function of chromium and tungsten. Contrary to the opinion held by some workers it now appears unquestionable that the element chromium imparts to steel the property of self-hardening by cooling in air from high temperatures. Indeed, a steel containing 6 per cent of chromium, with 0.63 per cent of carbon, possesses this property in a much greater degree than one containing 18 per cent of tungsten; it is not only much harder after the usual air-quenching from about 1300 deg. C., but its hardness is progressively raised even with comparatively slow rates of cooling, as the intial temperature is increased from 800 to 1000 deg. C. On the other hand, no hardening occurs when tungsten steel is cooled from those temperatures under exactly the same conditions.

CAUSE OF HARDNESS OF HIGH SPEED STEELS

Briefly, chromium in conjunction with carbon is the cause of the great hardness of high-speed steels, and it produces a marked lowering of the temperature at which hardening can be effected. The action of tungsten, in the absence of chromium, is to raise the temperature at which tempering or annealing begins, while in the presence of chromium it increases the intensity of the secondary hardness which is brought about by the low heat treatment and raises the tempering temperature.

SECONDARY LOW HEAT TREATMENT

The authors consider that there is now very little difficulty in giving a trustworthy explanation of Taylor and White's discovery that a secondary low heat treatment improves the efficiency of modern high speed steel. When this treatment is conducted at the temperature they advise—620 deg. C.—it gives the maximum degree of hardness. Though in the authors' experiments the hardness was determined at the ordinary temperature after the heating, there seems to be no doubt that the figures obtained in this way are a measure of what Mr. Taylor terms "red-hardness." For the determinations made after heating periods of five minutes, the maximum hardness obtained corresponds to 614 deg. C., which is practically the same temperature as Mr. Taylor suggests.

These facts indicate that valuable information regarding the relative merits of high speed cutting steels can be obtained from careful tempering experiments when made in conjunction with hardness determinations. Further, when more data are accumulated this simple method may be found sufficient to replace almost completely the very elaborate and costly standard cutting tests which are now necessary. In any case it should be found extremely useful for ascertaining the best temperature for the second or low heat treatment.

INFLUENCE OF INITIAL TEMPERATURE

The authors found that very rapid air-quenching from temperatures up to 1050 deg. C. has practically no hardening effect on a steel containing about 19 per cent of tungsten with 0.63 per cent of carbon. Even when quenched from about 1350 deg., it is much softer than a similar specimen of steel containing 6 per cent of chromium which has been slowly cooled in air. But when tungsten steel is tempered it undergoes a very pronounced secondary hardening and in fact after being heated to 638 deg. The presence of chromium in high speed steel increases the solubility of the tungsten to such an extent that with 6 per cent of the former element 19 per cent of the latter can be held in solution at about 1350 deg.

In view of these facts the authors believe that the influence of initial temperature may be correctly summarized as follows:

1. When the hardening temperature is low the tempering properties approximate to those of a pure chromium steel, softening takes place at lower temperatures, and little or no secondary hardening occurs. Under these conditions the full influence of the tungsten is not obtained because a large portion of it remains inert in consequence of being out of solution.

2. The maximum resistance to tempering and the greatest degree of secondary hardening can be obtained only by getting the tungsten in complete solution and for modern high-speed steels this can be effected only by heating the steel to about 1350 deg.

The Discussion

Prof. H. C. H. Carpenter said that the chief matter which has remained unexplained was the cause of the secondary hardening of heating to temperatures in the neighborhood of 600 deg. In his opinion Professor Edwards and his colleague had abundantly explained why that was the case, and he stated this, notwithstanding that the experiments on hardness were not carried out at the actual temperatures alluded to, but on specimens which had been heated at these temperatures over a certain period and then cooled to the ordinary temperature. As these results agreed so well with the practical tests it would be hypercritical to say that they were invalid because they were not carried out at the tempering temperatures. Professor Edwards would agree that the change which would take place in the material on cooling from these tempering temperatures to the ordinary temperatures was practical only. He regretted that the death of Mr. Taylor at a comparatively early age had prevented him from seeing these most interesting results, and which would have given him the very information he wanted.

CHROMIUM A SELF-HARDENING ELEMENT

The authors stated that "contrary to the opinion which has been held by some workers it is now unquestionable that the element chromium imparts to steel the property of self-hardening by cooling in air to very high temperatures." He was not certain, but he thought Professor Edwards had himself in mind when he wrote that sentence because, so far as he was aware, he was the only person who had constantly maintained the view that chromium was not a self-hardening element in high speed steel. However, he was now able to say that these experiments had convinced him that it was a self-hardening element under certain conditions. It was purely a question of the rate of cooling. It was his opinion that this paper abundantly made clear the physical influence of both chromium and tungsten and he accepted the author's conclusions absolutely.

Sir Robert A. Hadfield, referring to the magnificent work of Taylor and White in America, said he regarded this as of enormously valuable service to the metal world which had never been sufficiently recognised. He hoped that some one at this Institute, although it was now too late to award anything to either of the authors, would arrange for some posthumous reference to their work.

One point which was not referred to in the author's paper was the effect of tungsten. Tungsten when added to iron had the least amount of resistance compared with any other element. There was something curious about that. If one, or two, or three per cent of tungsten was added to iron and the electrical resistance was taken, it would be found that there was less increase than if silicon, chromium, vanadium, nickel or, in fact, any of the whole range of elements were added. That might have something to do with the extraordinary behavior of the influence of tungsten upon high speed tool steel.

PERMANENT MAGNET STEELS

Dr. W. Rosenhain asked the authors whether the secondary hardening was confined to those steels containing the comparatively high proportions of tungsten and chromium which were present in those self-hardening steels. There was a class of steel which also contained tungsten and chromium to a lesser extent, usually about 7 per cent of tungsten and up to 0.5 per cent of chromium, which were used for the making of permanent magnets. This was a subject of particular importance at the present time, and the question of how to get a higher degree of hardness, particularly magnetic hardness, had been up to now by no means a simple one. Therefore, this discovery of the increase of ball hardness due to this secondary heat treatment was possibly of considerable importance in that connection. Could Professor Edwards and his colleague say whether this secondary hardening was likely to occur in these magnetic steels with their composition which was not strictly speaking self-hardening? They did not get very hard by cooling in air, but they were made harder on quenching in oil or water. If they got further hardening by subsequent treatment it would be of practical importance.

Dr. J. E. Stead said there was no doubt that this paper was of very great practical value. He would suggest that all people who have to harden rapid cutting steels should carefully keep the diagrams in the paper, correlating the heat treatment with hardness. The interesting feature shown by the authors was that the tenacity decreased as the hardness increased. They had a steel having all the constituents in complete solid solution, and these when heated steadily up to the critical point mentioned of 720 deg., the hardness gradually rose up to 747 deg. It was known that after a properly treated rapid cutting steel had been in the fire for a time it got hardened, but it was not known until the authors had shown very clearly that the specific gravity decreased coincidentally.

Many years ago he had a habit of breaking off the points of turning tools prepared according to the maker's specifications. He had about a dozen of them. He broke the points off, polished and etched them and found, not the beautiful homogeneous structure given in the photographs in the paper, but all sorts of structures. In other words, the treatment they had had by the practical smith had not been such as to complete the solid solution of the constituents. When he received this paper he went to the smith and asked for a tool he had hardened. He then applied the author's heating to 614 deg., but instead of getting harder it got softer at that temperature.

IMPORTANCE OF PROPER HEATING BY SMITHS

Probably many people who read this paper would try the same experiment, but probably they would not have the same opportunities that he had for probing the matter through. What he found was that the primary heating had not been sufficient to produce complete solid solution. That was the explanation and he cautioned those who wished to complete these experiments that the right heating was necessary to get the best results. When they were below the right temperature they did not get that solid solution, and if they exceeded the temperature they undid what was done at the right temperature. In passing up a point was reached of complete solid solution, and if the material was overheated it commenced to separate out again. This was beautifully shown in the photomicrographs at the end of the paper, which showed that the mass had become heterogeneous again after having, of course, obviously been in the proper condition at one point of the heating.

As a rule, good smiths could be trusted to heat their steels properly, but they had only their eye to go by, and they were apt to treat a great many different steels, perhaps from half a dozen different makers with varying carbon and other constituents, with the same heat treatment, whereas the heat treatment required was very different, indeed. His own researches had shown that in practice these steels were not treated always so as to get the best results. In present times, when it was important that tools, especially those used for turning shells, should do the maximum amount of work, it was important that those who were doing this work should read and study this paper and apply the principles laid down.

Prof. C. A. Edwards in reply expressed the appreciation of Mr. Kikkawa and himself for the kind way in which the paper had been received. As regards the question of chromium and self-hardening he certainly had had Professor Carpenter in mind when he wrote that sentence, but he must also say that he had himself in mind, too. He personally had strongly clung to and followed the views expressed by Professor Carpenter. He really thought that his view was absolutely correct and his own experiments in an early paper indicated that they were so, so that if there was any blame in having considered chromium as not self-hardening, he must take it as much as Professor Carpenter. The explanation was, as Professor Carpenter had pointed out, the rate of cooling, and the critical rate of cooling special steels was, he thought, a most important one.

Professor Edwards stated that Mr. Kikkawa and himself had carried out a large number of experiments with some chrome steel and they were able to predict the possible critical points for any given rate of cooling from any determining initial temperature, and the results obtained showed that by carrying out experiments on special steels in that way would give a new practical weapon for working with special steels.

PERMANENT MAGNETS

Dr. Rosenhain had asked whether a steel containing 7 per cent of tungsten and 0.5 per cent of chromium would behave in the same way as regards secondary hardening as the steels which had been experimented with in the paper. He could only say that in all probability this would be the case, and if similar tests were carried out on such steels, results should be obtained which would indicate how best to treat magnet steel in order to get the higher degree of magnetic hardness. With that in view he was arranging to make magnetic and electrical resistance determinations on the same steel treated in exactly the same manner as had been indicated in the paper. Then it would be possible to correlate actual hardness, volume, magnetic variations with tempering and electrical resistance with tempering. That data ought to be useful.

Determining the Ash of Coal in the Field

The need of engineers, mine superintendents and purchasing agents to know the percentage of ash in coal without waiting often weeks for results from a laboratory has been met by a contrivance for determining this in the field. Such an apparatus is described in a Bulletin 621-A of the U. S. Geological Survey, entitled "Field Apparatus for Determining Ash in Coal," by C. E. Lesher. The apparatus is represented as light, compact and portable, readily assembled and easily carried. It has been in successful use for three years by field parties of the Survey. The bulletin gives instructions for its use, stating it to be simple to operate and capable of determining ash in coal with a possible error of less than 2 per cent.

The American Stamping & Enameling Company will remove its main offices from Bellaire to Massillon, Ohio, Nov. 15. The company has recently built a new plant in Massillon, but still retains its Bellaire plant.

Machinery Trade with South America

An Analysis of the Situation in Argentina, Chile and Peru by the Government's Special Agent, J. A. Massel

WASHINGTON, D. C., Nov. 9, 1915.—There is business for machinery manufacturers of the United States in Argentina, Chile and Peru and possibly in other South American countries, provided the proper methods and due expedition are employed to develop it; otherwise, as soon as the European conflict is over the trade, which has been seriously interrupted by the war, will drift back into the old British and German channels. This is the opinion expressed in the forthcoming report of Special Agent J. A. Massel, who recently made a comprehensive tour of South America for the investigation of the market for machinery and machine tools. Mr. Massel's report is unusually comprehensive and presents separate summaries of conditions in the leading countries.

Argentina

It is very evident, says Mr. Massel, that if we except lines of agricultural machinery and possibly a few others of minor importance, the North American manufacturer has so far had no market in Argentina for his products in general, and for machine tools in particular. Studying the reasons for this, the following would appear to be the most salient causes:

The very few American houses that endeavored to do business here failed to succeed owing in a great measure to their failure to adapt themselves to the business methods of this country. The American manufacturer was content to send out salesmen and travelers with little or no knowledge of the language of the country or of its customs, selling or endeavoring to sell mainly from catalogs and price lists printed in English; and even in the cases where it was possible to make sales in this manner, the prospective purchaser was called on to wait for several months for the delivery of his order. In sharp contradistinction to these methods, the European manufacturers, and more especially the German manufacturers, established up-to-date offices and stores, carried a large stock of material and in every way consulted the convenience of the market in which they sought to establish themselves.

The American manufacturer in general demanded payment for his goods, cash against shipping documents in New York. European firms have always granted credits ranging from three months to a year, or even longer, and included in the selling price of the machine the interest for the period of credit granted.

Europe has made large investments of capital here. Practically all of the important industries, the railroads, power plants, etc., are in the hands of Europeans, while American capital is practically non-existent in comparison. Argentina finds a free and large market for its produce in Europe. Americans have never paid much attention to this market, while European manufacturers have made every effort to secure it, which they have succeeded in doing. There is a good market for machinery in this country.

HOW TO GET THE BUSINESS

Instead of sending out armies of agents and representatives for the purpose of exchanging impressions with the Argentines, and making themselves loudly heard through the columns of the local press (all of which is beginning to irritate the Argentines and which leads to no definite results beyond a waste of time that might be more profitably employed), North American manufacturers should come together for the purpose of forming a species of co-operative organization, different types of machinery and machine tools being represented. The services of a really competent business man should be secured, the sort of man required being one with a general technical knowledge, who knows Spanish fluently and in addition possesses a knowledge of the customs and methods of this country. This man should be placed in full charge of the business. He should have full powers to close deals, using his own judgment without any interference from the manufacturers. A good salary and a liberal expense account should be granted him. Each manufacturer represented in this co-operative organization would make a consignment of the machinery built by him, but of the types and sizes to be specified by the general manager of the organization. This machinery would be carried in stock here in large show rooms. The organization would be divided into separate departments, each one handling some particular line, such as pumps, engines, machine tools, etc. In charge of each department could be appointed a competent man in that particular line. Good travelers and salesmen are procurable among the natives of this country, and good and practical mechanics are also easily obtainable here.

Once the house has been established more or less along the lines above indicated, the general manager would use his discretion in granting reasonable credits to reputable houses. The question as to the prices at which the machinery and materials could be sold would adjust itself, as here as in every other country a good machine will always fetch a fair price. By carrying a stock on hand the question of delivery of material is practically solved. One, two or more establishments of this nature could be formed, and followed out on these lines a North American campaign in the Argentine Republic would obtain for us our full share of the available business.

The great advantage to be derived from the formation of an organization such as the one outlined is the vast economy in marketing American goods that it implies; the much more accurate, reliable and complete information with regard to the market that is availiable to each manufacturer represented in the organization; the certainty enjoyed by each member that he has the services of a more efficient and better equipped establishment at his disposal for the sale of his products than he could possibly have if he were working on his own account; and finally, the certainty that if his goods are not salable in this manner they cannot be sold at all in this market.

BRANCH HOUSES

It is, of course, possible for our manufacturers to establish their own branches here, handling only their own productions; but the cost of living is so high, and the expenses of running such an establishment so great, that very careful study of conditions cannot be too strongly recommended before so doing. It is understood that American business houses that have been for many years established here, even though they have been doing a fair trade in their particular lines, have not been able to show results as good as might have been expected on account of the general high cost of trading here. When the subject of establishing such a business is under consideration, one of the first requisites that merits serious thought is the capacity of the manager to be appointed. Strict economy in the running of the business is essential if results satisfactory to the manufacturer are to be obtained.

Unless our manufacturers decide to follow the courses outlined above, either individually or by co-operation, they should give up the idea of getting business here. By following along the old lines of sending a man here with a catalog, they may succeed in getting an occasional order while the European war lasts, but once the war is finished and business again resumes its normal aspect, trade will inevitably turn back to Europe again, unless intelligent organization and business efforts be made in the meanwhile to secure our share.

of it for North America. The Argentines are good business men and know exactly what they want and what they get. Therefore the sooner we realize it the better. Finally it should be said that if our manufacturers desire to establish themselves here, they must be quick and fully realize that it is going to cost them some money the first year or so without expecting any returns.

Peru

Peru offers chiefly a market for cotton, mining and sugar machinery and for small machinery for general industrial purposes. We get a fairly good share of the mining machinery business, but the sugar factories and practically all the cotton and woolen mills are equipped with machinery from Europe. The sugar machinery comes from Great Britain, France and Germany and the cotton mill machinery chiefly from Italy and Great Britain. The principal reason why we do not get any more business is that all the importers of machinery doing business in Peru are either English, German or French; none of them are from the United States. If calls are made on houses representing some of our manufacturers, it is found that they are not equipped for some reason or other to get the business for us. Lack of care in keeping informed as to the requirements of the Peruvian manufacturers and especially the ability of American machinery producers to meet their needs seems to be the weak point. In one case investigated it was found that English sugar mills are preferred to American because the journals of the top and bottom rolls of the crushers are of the same diameter, thus enabling the owners to use a spare roll either at top or bottom, while it is assumed that American mills do not permit of this interchange. As a matter of fact American manufacturers of sugar machinery who are represented by Peruvian importing houses clearly specify this interchangeability, but the importers in the case investigated confessed that they had not read the specifications and were not aware of the facts, although they represented these American manufacturers for three years.

It also appears that importers representing American manufacturers do not follow up industrial development in Peru as they should. Some of the most experienced of these importers are unable to furnish data concerning the capacities of the largest factories or the types of machinery used.

Leading cotton mills are equipped with machinery from Italy for the reason that the managers in charge, and especially those who choose the equipment, are Italians.

It is interesting to note that the best machine shops in Peru, one in Arequipa and the other in Lima, are fitted with American tools. The principal reason for this is that the owners of both shops have been educated in the United States and have had practical training in that country and as a consequence are very enthusiastic regarding our tools and will have nothing but American machinery.

Chile

In Chile, as in the Argentine, the English and Germans have the upper hand in marketing their machinery. In the electrical line the Germans are indisputably the masters of the market, which is due to the fact that all the principal electric light and power plants are of German capital; therefore they control the situation.

We have the market for agricultural machinery and implements and to a certain extent of mining machinery, but as to machine tools and industrial machinery in general the English and Germans are occupying the first and second places respectively, and we rank third, although there is no reason why we should not improve our sales. There can be no question as to prices, for everything sells here very high and any organization that would be satisfied with legitimate profits could easily undersell the rest.

The same methods outlined in this report with respect to the Argentine could be adopted in Chile. Machinery should not be sold through commission houses for the reason that our manufacturers will never be in a position to know the local requirements and competition. Besides, prices which are being charged by commission houses are often excessive, which of course is detrimental to the interests of the manufacturers without their being in a position to know anything about it.

There is a fairly good market in Chile for general industrial machinery such as is used in breweries, bake shops, ice plants, blacksmith shops, small electric light plants, pumps of every description, etc., and small size machine tools, but the indications are that this last item will be in greater demand in the near future as there is a great deal of talk of putting through various enterprises which will necessitate the equipment of machine shops. There will be no immediate demand for anything, but the time is very opportune to start a business, as everything at present could be procured at considerably lower prices, including rent, help, etc., on account of the financial crisis through which this country is now passing, although the situation is rapidly improving.

At the risk of repeating the statement so often made about the shipping and banking facilities which we lack, the fact should be emphasized that those who have these facilities in connection with their other business are taking advantage to monopolize the market and keep out other competition by charging high freight rates. It is rather a difficult thing to prove, but it is commonly known that such is the case and the natives would certainly welcome a banking institution separate from freight carrying enterprises and merchants selling goods and they would also welcome steamship lines operated to carry freight and not in connection with the banking business or the selling of goods.

INVESTMENT POSSIBILITIES

As a whole, the country will offer in the near future a very large market for machinery of every description and it would not be a bad idea at all if more American men of enterprise came down here and made some investments in establishing various enterprises which would be profitable in themselves and at the same time increase our sales of machinery. The English and the Germans did it and are still doing it, and the fact is that these nations rank first and second while we rank third.

In marketing machinery it is indispensable to have branches in the principal industrial and mining centers like Santiago, Valparaiso, Concepcion, Iquique, Valdivia, Antofagasta and Punta Arenas. Chile offers in fact better chances for us to do business than the Argentine, although the market is not as important as a whole. The fact that the nitrate companies, of which there are 170, are not concentrated in the hands of one nation, which is also true of the various mining enterprises, the most important of which are in the hands of Americans and all of which use a great deal of machinery and are equipped with machine shops, should encourage our manufacturers to go after the business.

American manufacturers will draw their own conclusions, but it is certainly important in case they wish to continue business through commission houses to acquire better information regarding the men who are looking after their business. This is just as important a point as the considerations of credit facilities and shipping.

W. L. C.

The Trafik-Aktiebolaget Grangesberg-Oxelösund denies the report that is intends to discontinue shipments from the Norwegian port of Narvik, because of recent seizures of Swedish steamers bound from that port to Rotterdam. This is of special interest to the United States, for about 300,000 tons of Lapland ore is being exported to Philadelphia each year, and these exports will continue, according to Consul General Ernest L. Harris of Stockholm, Sweden. A cessation of shipments from Narvik would cripple the Lapland mining industry and make Sweden dependent solely on the German market.

The magnetic iron-ore deposits of Gordon Island, Chile, are referred to by Consul David J. D. Myers of Punta Arenas, Chile, as being for sale or exploitation by a company owning the mines.

ESTABLISHED 1855

THE IRON AGE

EDITORS:
A. I. FINDLEY
GEO. W. COPE W. W. MACON
CHARLES S. BAUR, *Advertising Manager*

Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.* Charles G. Phillips, *Vice-Pres.* Fritz J. Frank, *Secretary* M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: New England Building. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, $5.00 per year; single copy, 20 cents; to Canada, $7.50 per year; to other foreign countries, $10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

Labor and War Conditions

Since history has nothing comparable with the present war in destruction of life and wealth or in the number of great nations affected, all attempts at forecasts of conditions that will follow peace are guesses more or less at random. As yet few signs appear in the United States of efforts on the part of manufacturers whom the war has made busier than they have ever been, to hedge against the making of peace. It is well understood that even "firm" orders for munitions would become subject to various contingencies if the war should be terminated within a few months. Yet with war as the absorbing business of so many powers, it is scarcely possible to think of international trade in anything but the present abnormal and deranged condition. The upheavals in trade have been great enough to cause the prediction in some quarters that what will remain of the old relations in international business will scarcely equal what has been swept away. The economic changes will be tremendous. Highly suggestive in this connection is the comment of Lord Northcliffe, the London publisher, on what is to happen to British capital and labor. To an American interviewer he said:

> Before the beginning of next year my income tax will be $2.50 on every $5 of income. In my opinion this tax will never be less, even after the war. On the other hand, the working classes are receiving higher wages than they have ever received before. In view of the cheapness of living in this country they are receiving relatively higher wages than those of American workmen to-day. In my opinion these wages will never be lower. The rich are going to be poorer and the poor richer, and by the end of the war England will have a species of state socialism. A million and a half of young men who have been through hell for their country will come back and demand better working conditions as the price of their sacrifice. They will not put up with any nonsense. This situation is bound to have an effect on your country, where the difference between the rich and the poor is as great, if not greater, as it has been. I have been through your slums in New York and Chicago and know the conditions.
>
> In addition there is the subtle influence of the war. For months your people have been reading about the spilling of blood. This constant diet of war is sure to bring about an internal upheaval. The American Revolutionary War was the precursor of the French Revolution.

Highly overwrought is Lord Northcliffe's reference to a possible internal upheaval in the United States as a result of the constant diet of war for so many months. Evidently he had in mind the inflammatory influence of Frank P. Walsh's Industrial Commission report and appraised it at par. Social revolution has been seen often in the near distance by hysterical agitators of the Walsh type and at home its capacity to frighten is not great. But it is not to be denied that American manufacturers are giving serious thought to the ultimate consequences of labor union efforts to put some of our industries on a new basis because of the war. If wages now paid in Great Britain are never to go lower it is certain that industry there, as it seeks international trade, will stagger under a load for which British control of the seas will come far short of compensating. So far as machinery manufacture in the United States is concerned, all the energies of the unions are now bent to the task of putting permanent hobbles on the industry. The unions seem to be acting on the belief that nothing is ahead but the indefinite continuance of the present riot of high prices, full employment, inefficient labor and wages beyond any dream of normal times. There will come a rude awakening from that delusion when the world enters upon the war's reckoning and takes up the burden of living again under economic laws which the war has thrown to the winds.

More Capacity Wanted

Probably all the manufacturers of steel are giving close attention to the question of how they can quickly increase their capacity. The rapidly advancing markets of the past few weeks, with producers trying to dodge orders that insistent customers are endeavoring to force upon them, are eloquent testimony to the fact that steel is scarce and that much more steel could be sold if it could be produced.

The present problem of new construction is a particularly difficult one because the steel interests find, as a rule, that their works are very well aligned, with the different units properly proportioned. In previous periods of rapidly expanding demand many producers have found that by adding a little equipment here and making a few changes there they could so round out their propositions as to secure considerably more tonnage from them; but such circumstances do not as a rule exist to-day. The times lately have conduced to the rounding-out process,

since for years past very few new plants of any consequence have been built and the chief activity has been in strengthening weak links.

If a definite shortage had developed in any particular steel product it might seem entirely feasible simply to build additional finishing mills, but there are no such shortages; what shortage there is is in the crude steel.

However insistent the demand for steel at present, or during the war, American steel manufacturers well know that there is grave danger of enormous tonnages of very cheap steel being offered by steel works abroad, and no capital investment can be considered at this time unless it promises economical production. Any additions made to steel works must be additions that fit and that conduce to low production costs.

In the case of many plants lack of room prevents much expansion along the lines of the present layout, but in most cases the difficulty is that as to blast furnace and steel making and finishing capacity the plants are already well proportioned, and additions at one point or another would merely unbalance them. At a number of plants an open-hearth furnace or two has been added here and there in the past few months, illustrating well the fact that large additions are difficult.

It is well to consider, however, that the outlook for steel has changed in the past few weeks. Until very lately the war demand loomed very large indeed, but the proportions are now changed. The demand for steel from domestic consumers is very heavy, and yet there is very little new building. If steel can be sold at present high prices it is not unreasonable to hope that in years to come, when there is a normal demand for steel of various descriptions for buildings, still more steel can be sold at moderate prices. The menace of cheap European steel immediately after the war is a serious one, but the United States is laying the foundations of prosperity for the future, and if it is true that cheap steel is going to be offered by foreign mills it must be also that some cheap labor will be available for American mills. With the changed outlook of the past few weeks, showing the greater possibilities of American steel consumption, it is well to consider whether complete plants, from the ground up, may not prove a profitable investment in future years, taking them all as they come. It is quite certain, however, that the question that is engaging the steel-making trade at the moment is not how one may build for future years but how one may build for the next few months, if it is only to add 1000 tons or 5000 tons to the monthly steel output.

Supplies of Ferromanganese

Our imports of manganese ore reached in August the surprising total of 57,867 tons, contrasting, for instance, with only 27 tons imported in February, and contrasting also with only 10,611 tons imported by Great Britain in the same month. It is evident that there is an entirely new alignment in the manganese movement, and that American steel manufacturers are meeting with decided success in shaking off their dependence upon England for supplies of ferromanganese. Until the war started there was scarcely any production of ferromanganese in the United States except by the United States Steel Corporation. For several years the imports and the domestic production had about balanced, the five years 1909 to 1913 inclusive showing an average of 102,000 tons a year imported and 95,000 tons made at home. Even in 1914, taking the year as a whole, there was a very good supply considering the smallness of the year's steel production, as the imports were 82,217 tons and the domestic production 106,083 tons.

The present year, however, opened with a poor outlook. Manganese ore imports were running at a low rate and importations of the alloy were greatly restricted. The British exporters of ferromanganese were required to exact a guarantee from their customers in the United States intended to prevent any steel made from the ferromanganese from reaching England's enemies. The situation was further complicated in July by the British Government issuing orders whereby certain stocks of manganese ore and ferromanganese were to be maintained in the United Kingdom.

So many American steel manufacturers have lately been making ferromanganese for themselves that the restriction as to the destination of steel made with English ferromanganese has become of no consequence. If it were possible to make shipment to Germany, there are many steel makers in the United States who could furnish the steel, made with their own and not British ferromanganese. The important question is simply how much ferromanganese can be secured from England and how much ore can be found for the manufacture in the United States. These ore importations have lately been running at a high rate.

In the five years prior to 1914 manganese ore imports averaged 256,000 tons a year, or 21,200 tons a month, and equal to 2.7 tons of manganese ore per ton of ferromanganese produced. As some stocks of ore were accumulated, the proportion of ore required was perhaps a trifle less than 2.7 tons per ton of alloy. The ore imports this year have been as follows:

	Gross Tons
January	9,849
February	27
March	398
April	218
May	16,645
June	31,011
July	28,988
August	57,867
Eight months	145,003

Even for the eight months the average imports were 18,000 tons a month, or not much below the average in previous years, but in June, July and August there was attained a rate of 39,300 tons a month, equivalent to ferromanganese production at the rate of 175,000 tons a year. The production of steel is now at a rate about 40 per cent. greater than the average rate in the five years in which ferromanganese supplies averaged 197,000 tons a year, indicating at the same proportionate consumption about 275,000 tons annually of ferromanganese. There is reason to believe, however, that the steel industry has found means to get along with con-

siderably smaller proportions of ferromanganese than formerly.

British imports of manganese ore have been running far below their average, just as ours lately have been running far above their average. British manganese ore imports have been as follows:

	Gross Tons
1912	387,738
1913	601,177
1914	479,435
1915, six months	134,526
July	19,632
August	10,611
September	45,045
1915, nine months	209,814

Added to the Brazilian supplies of manganese ores there will be small shipments in the near future from Cuba. The Ponupa mine has been accumulating ore and will be able to ship at the rate of 4000 tons a month, while from another property on the Cuban south coast, from which trial cargoes have been received, shipments can be made at the rate of 800 tons a month.

A Striking Export Showing

Figures covering exports of tonnage iron and steel and machinery by months from January to September, 1915, show the wonderful rapidity with which our shipments to foreign countries have increased since the beginning of the current calendar year. The breaking out of the European war early in August, 1914, resulted in an immediate shrinkage in our exports, which, in tonnage iron and steel, amounted to approximately 75 per cent. In the remaining months of that calendar year both exports and imports showed fluctuations, but the beginning of the new year was signalized by a revival in the export business, which has grown more marked with each succeeding month. In April and May there was a slight recession in some items, but this was more than made up in June, when the total export of tonnage commodities more than doubled. An increase of nearly 300 per cent was recorded in shipments of tonnage iron and steel in August as compared with January, and this rate of increase is maintained as to the most important items in the list.

The following table shows the total exports of tonnage iron and steel by months, January to September, and the shipments by months of the most important items in the list:

Exports of Iron and Steel—Gross Tons

1915	Steel Bars	Billets and Blooms	Steel Rails	Wire*	Total Exports
Jan.	9,511	2,864	17,625	6,123	118,772
Feb.	8,776	2,850	10,936	10,826	121,203
March	10,338	4,235	25,196	15,303	159,998
April	9,672	4,997	27,112	13,720	161,952
May	10,151	6,872	15,659	12,399	138,656
June	58,453	48,999	34,547	51,323	355,829
July	49,524	67,121	31,802	52,560	368,893
Aug.	42,327	89,134	52,040	45,209	401,298
Sept.	37,637	54,782	41,060	54,486	381,317

*Includes barb wire.

While the machinery trade began to feel the revival in export business before it was reflected in tonnage commodities, there has nevertheless been a steady increase in the total monthly exports, May being the only month which fails to show an actual gain over the preceding month. The total exports of machinery have risen from $7,676,078 in January to $12,377,389 in September.

The following table shows the total exports by values of machinery by months, January to September, and the figures for several of the most important items:

Exports of Machinery.

1915	Engines and Parts	Metal-Working Machinery	Sugar Mill Machinery	Total
Jan.	$1,151,979	$2,903,740	$69,602	$7,676,078
Feb.	695,338	2,523,722	201,124	7,936,467
March	1,436,758	1,075,896	68,301	9,588,274
April	1,318,894	3,300,953	199,401	10,399,716
May	1,267,599	3,762,567	138,084	10,214,062
June	1,025,035	3,735,562	169,738	10,266,981
July	1,427,042	3,872,358	245,886	11,409,622
Aug.	1,625,928	3,624,411	646,120	11,439,291
Sept.	2,253,356	3,256,973	606,008	12,377,389

In striking contrast with the great strides made in our export trade is the movement in imports of tonnage iron and steel for the first nine months of the current calendar year. They are so insignificant that it is unnecessary to give the figures in detail by months. Pig iron, which includes ferromanganese, is the only item that has shown a steady increase throughout the nine months.

National Foreign Trade Convention

James A. Farrell, chairman of the National Foreign Trade Council, has issued a call for the third National Foreign Trade Convention to meet in New Orleans, Thursday, Friday and Saturday, Jan. 27, 28 and 29, 1916. "Commercial Preparedness" will be its motto. All Americans engaged in or desirous of entering oversea commerce, and particularly all boards of trade, chambers of commerce and other commercial and industrial organizations, are invited to participate in this practical and constructive discussion of policies and practices necessary to meet the keener competition which the United States may expect to encounter in world markets after the war.

The rehabilitation of the American merchant marine, the utilization of the tariff to encourage American foreign trade and protect it from discrimination, the adaptation of commercial education to the needs of foreign trade, and ways and means for the smaller manufacturers and merchants to engage in and share the benefits of foreign trade, will be considered from the standpoint of the chief elements in foreign trade, namely, natural products and agriculture, manufacturing, merchandising, transportation and finance. Instead of extensive treatises on the theory of foreign trade, the convention will be largely given over to group sessions for practical discussion of actual problems.

Representatives of a number of the largest American corporations, which have been eminently successful in foreign trade, will place their knowledge and experience at the disposal of the convention. Delegates will also have the advantage of consultation with the foreign trade experts of the Department of Commerce, who will be in New Orleans during the convention.

The report current in Philadelphia last week that a shipbuilding combination was about to be organized, including the Maryland Steel Company's plant and that of the New York Shipbuilding Company, was denied by Samuel M. Knox, president of the New York Shipbuilding Company. It evidently grew out of the fact that the Mellen and Frick interests associated with William H. Donner in the recent acquisition of the Pennsylvania Steel Company and the Maryland Steel Company are stockholders in the New York Shipbuilding Company.

Hiram Swank's Sons, fire brick manufacturers, Johnstown, Pa., are increasing their plants at Johnstown and Irvona, Pa., about 25 per cent and within a short time will have a capacity of 35,000,000 brick per year. They are adding seven new kilns, making a total of twenty-seven.

FOUNDRY EXHIBITION OF 1916

It Will Be Under the Auspices of Foundrymen's Associations

A. O. Backert, secretary American Foundrymen's Association, has issued the following statement in his capacity as secretary of a special committee of the American Foundrymen's Association and the American Institute of Metals. It gives details of the new arrangement for the annual exhibition of foundry equipment and supplies, which was referred to in our issue of Nov. 4:

To the Members of the American Foundrymen's Association:

As a result of several conferences, held recently at Cleveland and Pittsburgh, by the special committee empowered by the American Foundrymen's Association and the American Institute of Metals to select the time and place for the 1916 foundrymen's convention it has been decided to meet in Cleveland during the week of Sept. 11.

At Atlantic City the executive board of the American Foundrymen's Association authorized the appointment of a committee of five to decide upon next year's meeting place and this committee was instructed by the American Institute of Metals to serve also in its behalf. This special committee is constituted as follows: R. A. Bull, Commonwealth Steel Company, Granite City, Ill., president of the American Foundrymen's Association, chairman; Joseph T. Speer, Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, and Alfred E. Howell, Phillips & Buttorff Mfg. Company, Nashville, Tenn., past presidents; J. P. Pero, Missouri Malleable Iron Company, East St. Louis, Ill., senior vice-president, and A. O. Backert, Cleveland, secretary American Foundrymen's Association.

The annual exhibition of foundry equipment and supplies, to be held concurrently with the meetings of these organizations, will be conducted under the auspices of the American Foundrymen's Association and the American Institute of Metals. This decision was reached after mature deliberation and represents the unanimous action of the members of this special committee. It also has been approved heartily by J. S. Seaman, Seaman-Sleeth Company, Pittsburgh, past president of the American Foundrymen's Association, and Jesse L. Jones, Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., president of the American Institute of Metals, with whom the members of the special committee met for counsel.

Since the interests of manufacturers of foundry equipment and supplies, who make exhibits at these annual shows, and the members of the American Foundrymen's Association and the American Institute of Metals are mutual, it is the sentiment of this special committee that the exhibitors should share in the profits, to be paid in the form of rebates on the cost of their space.

The exhibition will be held in the Cleveland Coliseum, located on Thirteenth Street in the center of Cleveland's business district. The Coliseum is within one block of the Hotel Statler, three blocks from the Hollenden, and is only a short walking distance from the other Cleveland hotels. It contains 60,000 sq. ft. of floor space on one level and is admirably adapted for a foundry show.

Sealed proposals have been invited from corporations and individuals capable of conducting exhibits, which are to be submitted to the secretary of this special committee, A. O. Backert, Twelfth and Chestnut Streets, Cleveland, Ohio, on or before 12 o'clock noon, Eastern time, Saturday, Nov. 13, 1915.

This communication has been authorized by this special committee and its secretary has been instructed to notify you of the action taken.

The Boston Branch, American Society of Mechanical Engineers, will be the guests of the Providence Association of Mechanical Engineers at a joint meeting in Providence, R. I., Nov. 18. Excursions are planned for the afternoon to the plants of the Gorham Mfg. Company, General Fire Extinguisher Company, and Brown & Sharpe Mfg. Company and the engineering laboratories of Brown University. In the evening a banquet will be held at the Narragansett Hotel, for which an interesting program has been arranged.

CONTENTS

Machine Design in a Rhode Island School 1105
A Rhythmical Market Report 1107
General Electric Practice in Sherardizing 1108
An 8-In. Cylinder Jolt Ramming Machine 1110
Case-Hardening Retorts and Furnaces 1111
Export Price Records 1114
Power Scraper Shovel for Ore Boats 1115
Safety in Crane Chains 1116
An Aerial Electric Grinding Machine 1117
A Uniform Basis for Figuring Foundry Costs 1118
Modern Abrasives Described 1121
Pennsylvania Welfare and Engineering Conference 1121
Welding and Cutting Metals 1122
Pouring Systems for Gray-Iron Foundries 1123
Rapid Unloading of Coal 1125
The Hardening of High Speed Tool Steel 1126
Determining the Ash of Coal in the Field 1127
Machinery Trade with South America 1128
Labor and War Conditions 1130
More Capacity Wanted 1130
Supplies of Ferromanganese 1131
A Striking Export Showing 1132
National Foreign Trade Convention 1132
Foundry Exhibition of 1916 1133
Locomotive Orders Still Growing 1133
The Iron and Metal Markets 1134
Tungsten Still Soaring 1149
Personal 1150
Crucible Steel Company Report 1151
The Eastern Iron-Ore Situation 1151
September Foreign Trade 1152
Six New Worth Open-Hearth Furnaces 1153
Alton Steel Hoop Plant Improved 1153
Steel Corporation Extensions 1153
Pittsburgh and Nearby Districts 1154
New Installations of Heroult Electric Furnaces 1154
British Embargo on Steel Exports 1155
Lake Ore Shipments in October 1155
A New French Purchasing Commission 1155
Obituary 1155
New England Labor Troubles 1156
New Electric Steel Plant to Use the Rennerfelt Furnace 1156
Buying Machine-Tool Plants 1157
Electric Steel for Saws and Knives 1157
Extras Charged on Large Rivets 1157
German Steel Shipments Still Declining 1157
Virginia Iron, Coke & Coal Report 1158
The New Rate of Railroad Buying 1158
Expansion at the Japanese Imperial Steel Works 1158
Possible Tax on War Munitions 1159
A Crisis in the Chinese Lead Market 1159
Fire at Bethlehem Steel Company's Plant 1159
Steel Corporation Orders Show Largest Gain 1159
High Cost of Plumbago Crucibles 1159
Customs Decisions 1160
By-Products from Coke Ovens in 1914 1160
Benzol Output of By-Product Coke Ovens 1160
Magnesite and Chrome Ore Imports 1160
August Exports of Zinc 1160
Judicial Decisions 1160A
Machinery Markets and News of the Works 1160B
New Trade Publications 1162

Locomotive Orders Still Growing

New locomotive orders in the last week amount to 95. The Baltimore & Ohio has ordered 15 from the American Locomotive Company and 15 from the Baldwin Locomotive Works, while the Pittsburgh & Lake Erie has placed orders for 10 with the American Locomotive Company, which will also furnish 6 locomotives for the Pekin-Kalgan Railroad. It is stated that the Cincinnati, Indianapolis & Western has ordered 35 locomotives, of which the Lima Locomotive Corporation will build 15 and the Baldwin Locomotive Works, 20. Orders for one and two locomotives each make up the remaining 14. These make the total reported for the last three weeks 315. A recent estimate places the orders for October at 189, with 129 ordered in the first week in November. The total for the year thus far is placed at 1630, of which 647 are for export. Nearly as many locomotives were ordered in October and the first week in November as in the third quarter of the year, when 370 were ordered.

The Manufacturers' Association of Hamilton, Ohio, was organized last week and the following officers elected: President, F. C. Trowbridge; vice-president, A. Wood; secretary, A. W. Margedant; treasurer, Henry A. Rentschler. The object of the association is to bring about closer co-operation between employers and their employees and later on it is proposed to take up the matter of industrial education.

The Iron and Metal Markets

RECORD RISE IN ORDERS

Steel Corporation Reports 847,000 Tons

Domestic Buying Expands Remarkably, with Exports Stationary—Prices Still Rising

The Steel Corporation's statement that its unfilled orders increased 847,000 tons last month gave the first definite measure of the steel trade's sensational leap forward in October. This is an unparalleled record but is thus only in keeping with all other developments in the current market.

Price advances have had no effect of curtailing demand; it is, in fact, heavier now than at any other stage in the present remarkable movement. In the past week pig iron, billets and a number of finished products have gone higher. In general Northern pig irons are 50 cents a ton higher, billets and sheet bars $1, forging billets $3, bars, plates and shapes $2, light rails $2.50, spikes $3, bands $1, shafting $6 and some grades of scrap 50 cents to $1.

The scarcity of certain forms of material is more serious than the advances in price. Output of some manufacturing consumers is likely to be curtailed because steel cannot be had.

In the flood of October orders domestic business figured to a larger extent than in many months. Exports in September of products reported in tons were 381,000 tons against 401,000 tons in August. Values of all iron and steel exports, including machinery, were $38,400,000, against $37,727,000 in August. The scarcity of vessel room may have prevented the increase looked for in September; but the statistics raise the question whether the war export movement has reached its height.

Shipments under bar, plate and shape contracts are being made at $5 to $8 a ton below the new 1.60c. Pittsburgh level. Consequently specifications are exceedingly heavy and some consumers may be able to add to their stocks in this way, but they are the exception. Warehouse prices have advanced $3 a ton for leading products and the demand upon such stocks has grown rapidly as mills have been compelled to turn buyers away.

Plate mills are now in stronger position than structural mills, as on large business in shapes 1.55c. Pittsburgh could be done and probably 1.50c., while plates and bars are stiff at 1.60c. In vessel plates the demand has rolled up to imposing proportions, 20,000 tons having just been closed in the East. There was also a 20,000-ton contract with the Standard Oil Company for the first half of 1916.

Plates for Japan's large program of merchant vessel building for Pacific trade have been shipped in large quantities from the Central West and heavy shipments are yet to be made.

Some urgent inquiries for war bars are up, and in the past week on 26,000 tons for France, for which delivery was wanted within two or three months, $15 a ton above the market was offered but no mill could take the order.

Deliveries on some of the cars now under inquiry will depend more on steel mills than on car shops. About 10,500 cars were placed in the week and roundly 35,000 are before the market. Railroads will feel the pinch of car scarcity before the makers can come to their relief.

The Chicago & Northwestern has made definite an order for 40,000 tons of rails against its general reservation, and the Rock Island receivers have been authorized to buy 40,000 tons for 1916.

Sheet mills have been filling up, particularly on blue annealed product, and several producers have their capacity taken up for four to five months.

On wire products a further advance of $2 is looked for and may be made this week.

The Carnegie Steel Company has announced $28 as its price for Bessemer sheet bars for the first quarter of 1916 and $30 for open-hearth. Steel casting plants have been selling considerable steel for conversion into forging billets. Sales of the latter have been made at $45 for ordinary carbons, and as high as $50 is reported in the Central West.

Steel-making pig iron has advanced under further buying and Bessemer iron is now $16.50 at Valley furnace. Of basic about 40,000 tons has been sold at $15.50, Valley, following the heavy buying movement of the preceding week.

Chicago pig-iron makers were slow in making advances, but they have made up in the frequency with which prices have been marked up in the past 10 days, carrying No. 2 iron to $17 at furnace. All foundry iron markets are stronger and there is a steady run of buying at the higher prices. These represent generally an advance of $1 in three weeks. Silvery iron in southern Ohio has been active and is $1.50 higher, putting it $8 above the price of a year ago. Charcoal irons have had a good movement with advances for the week of 50c. to $1.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month and one year previous

	Nov. 10, 1915.	Nov. 3, 1915.	Oct. 13, 1915.	Nov. 11, 1914.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia...	$16.75	$16.75	$16.25	$14.50
No. 2, Valley furnace...	**15.25**	15.00	14.75	12.75
No. 2 Southern, Cin'ti...	15.90	15.90	14.40	12.90
No. 2, Birmingham, Ala.	13.00	13.00	11.50	10.00
No. 2, furnace, Chicago*	**17.00**	16.50	14.25	12.50
Basic, del'd, eastern Pa.	17.00	17.00	17.00	14.00
Basic, Valley furnace..	15.50	15.50	15.00	12.50
Bessemer, Pittsburgh...	**17.45**	16.95	16.95	14.55
Malleable Bess., Ch'go*	**17.00**	16.50	15.00	13.00
Gray forge, Pittsburgh..	**15.45**	15.20	14.70	13.40
L. S. charcoal, Chicago.	16.75	16.75	15.75	15.75
Billets, etc.				
Per Gross Ton:				
Bess. billets, Pittsburgh.	**26.00**	25.00	24.50	19.50
O.-h. billets, Pittsburgh.	**27.00**	26.00	25.00	19.50
O.-h. sheet bars, P'gh...	**28.00**	27.00	25.50	20.00
Forging billets, base, P'gh	**45.00**	42.00	34.00	24.00
O.-h. billets, Phila.....	32.00	32.00	30.00	21.40
Wire rods, Pittsburgh...	35.00	35.00	31.00	25.50
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	**1.709**	1.659	1.559	1.12
Iron bars, Pittsburgh...	1.50	1.50	1.40	1.15
Iron bars, Chicago.....	1.45	1.45	1.35	0.95
Steel bars, Pittsburgh..	**1.60**	1.50	1.40	1.10
Steel bars, New York...	**1.769**	1.669	1.569	1.31
Tank plates, Pittsburgh.	**1.60**	1.50	1.40	1.10
Tank plates, New York..	1.769	1.769	1.569	1.26
Beams, etc., Pittsburgh..	**1.60**	1.50	1.40	1.10
Beams, etc, New York.	1.669	1.669	1.569	1.26
Skelp, grooved steel, P'gh	**1.60**	1.45	1.40	1.10
Skelp, sheared steel, P'gh	**1.70**	1.50	1.45	1.15
Steel hoops, Pittsburgh..	1.75	1.75	1.50	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire,	Nov. 10, 1915.	Nov. 3, 1915.	Oct. 13, 1915.	Nov. 11, 1914.
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	**2.20**	2.15	2.00	1.90
Galv. sheets, No. 28, P'gh	**3.70**	3.60	3.50	2.90
Wire nails, Pittsburgh..	1.85	1.85	1.75	1.60
Cut nails, Pittsburgh....	1.80	1.80	1.70	1.60
Fence wire, base, P'gh..	1.70	1.70	1.60	1.40
Barb wire, galv., P'gh.	2.70	2.70	2.60	2.00
Old Material,				
Per Gross Ton:				
Iron rails, Chicago.....	**14.50**	14.25	13.50	11.00
Iron rails, Philadelphia.	17.50	17.50	18.50	13.00
Carwheels, Chicago	**13.00**	12.50	12.00	9.75
Carwheels, Philadelphia.	**14.00**	13.50	14.00	9.50
Heavy steel scrap, P'gh.	**15.50**	15.00	14.00	10.00
Heavy steel scrap, Phila.	14.50	14.50	15.00	9.25
Heavy steel scrap, Ch'go.	**12.75**	12.50	11.75	8.00
No. 1 cast, Pittsburgh...	13.50	13.50	13.00	10.50
No. 1 cast, Philadelphia..	14.00	14.00	14.00	11.00
No. 1 cast, Ch'go (net ton)	11.75	11.75	10.50	8.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt....	**$2.50**	$2.25	$1.85	$1.50
Furnace coke, future....	**2.50**	2.35	2.25	1.75
Foundry coke, prompt....	**3.00**	2.75	2.25	1.90
Foundry coke, future...	**2.75**	2.60	2.50	2.15
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	**18.25**	17.87½	18.00	11.50
Electrolytic copper, N. Y.	**18.12½**	17.87½	18.00	11.25
Spelter, St. Louis.....	**15.75**	14.75	13.00	4.80
Spelter, New York.....	**16.00**	15.00	13.25	4.95
Lead, St. Louis.....	**5.05**	4.80	4.42½	3.40
Lead, New York.....	**5.15**	4.90	4.50	3.50
Tin, New York.....	**36.50**	35.87½	32.75	34.25
Antimony, Asiatic, N. Y..	**36.00**	35.50	28.50	15.50
Tin plate, 100-lb. box, P'gh.	**$3.25**	$3.15	$3.15	$3.15

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 73.9c. on plates, structural shapes and sheets and 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal is 56.9c.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, $1.60c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated Feb. 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft. are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the prices of 3-16 in.

Allowable overweight, whether plates are ordered to gage or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gages under ¼ in. to and including 3-16 in....	.10
Gages under 3-16 in. to and including No. 8....	.15
Gages under No. 8 to and including No. 9.....	.25
Gages under No. 9 to and including No. 10.....	.30
Gages under No. 10 to and including No. 12....	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths under 3 ft. to 2 ft., inclusive.	.25
Cutting to lengths under 2 ft. to 1 ft., inclusive.	.50
Cutting to lengths under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Products.—Prices to jobbers: Fence wire, Nos. 9 to 9, per 100 lb., terms sixty days or 2 per cent discount in ten days, carload lots, annealed, $1.70; galvanized, $2.40. Galvanized barb wire and staples, $2.70; painted, $2. Wire nails, $1.85. Galvanized nails, 1 in. and longer, $1.75 advance over base price; shorter than 1 in., $2.25 advance over base price. Woven wire fencing, 68½ per cent off list for carloads. 67½ off for 1000-rod lots, 66½ off for less than 1000-rod lots.

The following table gives the price per 100 lb. to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.75	$1.80	$1.85	$1.90	$2.00	$2.10	$2.20	$2.30
Galvanized ...	2.65	2.70	2.75	2.80	2.90	3.00	3.30	3.40

Wire Rods.—Bessemer, open-hearth and chain rods, $35.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 1.50c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.....	.10
H-beams over 18 in.....	.10
Angles over 6 in., on one or both legs.....	.10
Angles, 3 in. on one or both legs less than ¼ in. thick, as per steel bar card, Sept. 1, 1909....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths under 3 ft. to 2 ft. inclusive..	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive..	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from Aug. 16, 1915, on steel and iron galvanized pipe, and from Nov. 1, 1915, on steel and iron black pipe, all full weight:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜....	71	46½	⅛ and ¼.....	63	37
½	75	59½	⅜	63	37
¾ to 3	78	63½	½	67	47
			¾ to 2½	70	52

Lap Weld

2	75	60½	1¼	54	36
2½ to 6.....	77	62½	1½	65	47
7 to 12.....	75	58½	2	66	49
13 and 14.....	61½	..	2½ to 4.....	68	52
15	59	..	4½ to 6.....	68	52
			7 to 12.....	66	50

Reamed and Drifted

1 to 3, butt.....	76	61½	1 to 1½, butt...	68	50
2, lap	73	58½	2, butt	68	50
2½ to 6, lap....	75	60½	1¼, lap	52	34
			1½, lap	63	45
			2, lap	64	47
			2½ to 4, lap....	66	50

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜...	66	49½	⅜	60	43
½	71	58½	½	65	51
¾ to 1½.....	75	62½	¾ to 1½.....	69	53
2 to 3	76	63½	2 and 2½.....	70	54

Lap Weld, extra strong, plain ends

2	72	57½	1½	64	48
2½ to 4.....	74	59½	2	66	49
4½ to 6.....	73	58½	2½ to 4.....	68	52
7 to 8.....	67	50½	4½ to 6.....	67	51
9 to 12	62	45½	7 to 8.....	60	44
			9 to 12.....	55	39

Butt Weld, double extra strong, plain ends

½	61	48½	½	55	40
¾ to 1½.....	64	51½	¾ to 1½.....	58	43
2 to 2½	66	53½	2 and 2½.....	60	45

Lap Weld, double extra strong, plain ends

2	62	49½	2	56	40
2½ to 4.....	64	51½	2½ to 4.....	58	45
4½ to 6.....	63	50½	4½ to 6.....	57	44
7 to 8	57	40½	7 to 8.....	50	33

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on less than carloads, f.o.b. Pittsburgh, freight to destination added, on lap welded steel tubes and standard charcoal iron tubes, effective from Oct. 29, 1915, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1½ in.	48	1½ in.	43 to 44
1¾ and 2 in.....	60	1¾ and 2 in.....	47 to 48
2¼ in.	57	2¼ in.	44 to 45
2½ and 2¾ in.....	63	2½ and 2¾ in.....	51 to 52
3 and 3¼ in.....	68	3 and 3¼ in.....	55 to 56
3½ to 4½ in.....	69	3½ to 4½ in.....	57 to 58
5 and 6 in.....	62	5 and 6 in.....	51 to 52
7 to 13 in.....	59		

Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Sheets.—Makers' prices for mill shipment on sheets, of U. S. Standard gage, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms thirty days net, or 2 per cent cash discount in ten days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.65 to 1.75
Nos. 9 to 10	1.70 to 1.80
Nos. 11 and 12	1.75 to 1.85
Nos. 13 and 14	1.80 to 1.90
Nos. 15 and 16	1.90 to 2.00

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.80 to 1.85
No. 12	1.80 to 1.85
Nos. 13 and 14	1.85 to 1.90
Nos. 15 and 16	1.90 to 1.95
Nos. 17 to 21	1.95 to 2.00
Nos. 22 and 24	2.00 to 2.05
Nos. 25 and 26	2.05 to 2.10
No. 27	2.10 to 2.15
No. 28	2.15 to 2.20
No. 29	2.20 to 2.25
No. 30	2.30 to 2.35

Galvanized Sheets of Black Sheet Gage

	Cents per lb.
Nos. 10 and 11	2.70 to 2.80
No. 12	2.80 to 2.90
Nos. 13 and 14	2.80 to 2.90
Nos. 15 and 16	2.90 to 3.00
Nos. 17 to 21	3.05 to 3.15
Nos. 22 and 24	3.25 to 3.35
Nos. 25 and 26	3.40 to 3.50
No. 27	3.55 to 3.65
No. 28	3.70 to 3.80
No. 29	3.85 to 3.95

Pittsburgh

PITTSBURGH, PA., Nov. 9, 1915.

Advances in prices do not curtail the demand, which is heavier now than at any time since the upward movement started and much beyond the capacity of the mills to supply. Bessemer pig iron has advanced 50c. per ton; billets and sheet bars (both Bessemer and open-hearth), $1 or more; forging billets, at least $3; light rails, about $2.50; shapes, plates and bars, $2; railroad spikes, $3; bands, $1; shafting, $6, and some grades of scrap, 50c. to $1. It is a sellers' market in every sense of the term, and buyers are having trouble in getting the mills to accept orders at to-day's prices. Conditions existing in the steel trade to-day are without precedent, and if the present enormous demand continues there is no telling how high prices will go. Finished products rolled from open-hearth stock are almost certain to be higher, as there is a famine in the supply of open-hearth steel, and it brings almost any price that sellers care to ask. The fabricating shops and other finishing concerns report they are sold up for four to six months. The large steel companies will not agree to protect consumers for three to four months ahead, even at present prices, and will only accept specific orders for shipment at convenience of the mill. The market has reached the point where it is a question of getting the material, prices cutting very little figure. If the European war goes on, steel will go to unheard-of prices, but if peace negotiations are started there is likely to be a sudden halt. The steel companies say they do not want any higher prices than are ruling now and they are trying to hold the market in check, but so far with very little success.

Pig Iron.—There has been an advance of 50c. per ton in standard Bessemer, malleable Bessemer, gray forge and No. 2 foundry, and basic is expected to follow in a few days. It is learned that the recent purchases of the Youngstown Sheet & Tube Company were altogether about 75,000 tons of basic, all at $15.50 at furnace, and about 25,000 tons of Bessemer at $16. The Republic Iron & Steel Company bought 8000 tons of Bessemer, and Jones & Laughlin Steel Company 60,000 tons of basic. A consumer in the Wheeling district has just closed for 12,000 to 15,000 tons of basic at about $15.50 at furnace. We note a sale of 12,000 tons of Bessemer, supposedly to a Wheeling interest, at $16.50; 1000 tons at $16.25, and two lots of 1500 tons each at $16.50, all at furnace. We also note sales amounting to about 40,000 tons of basic made since last week at $15.50. We note a sale of 500 tons of malleable Bessemer at $15.75. The whole pig-iron market is very strong and still higher prices are likely. We quote standard Bessemer iron at $16.50; basic, $15.50; malleable Bessemer, $15.75; gray forge, $14.50, and No. 2 foundry, $15.25 to $15.50, all at Valley furnace, the freight rate for delivery in the Cleveland or Pittsburgh district, being 95c. per ton.

Billets and Sheet Bars.—The Carnegie Steel Company has announced that its price on Bessemer sheet bars for delivery in first quarter of 1916 is $28, and on open-hearth sheet bars, $30, both at mill. Most consumers are covered by contracts for remainder of this year, but it is said few contracts have been closed on sliding scales or otherwise for first quarter and first half of next year. There is a famine in open-hearth steel, and it is hard to find at any price. We note a sale of 1500 tons of open-hearth sheet bars for delivery over remainder of this year at $28, maker's mill. The steel casting plants are actively in the market as sellers of forging billets at very high prices. We note sales of 100 and 250 tons of ordinary carbon forging billets at $45, maker's mill. For delivery over the remainder of this year we quote; Bessemer billets, $26; open-hearth billets, $27; Bessemer sheet bars, $27, and open-hearth sheet bars, $28, all at maker's mill, Pittsburgh or Youngstown district. It is probable that open-hearth billets would sell higher than $27 if they could be supplied promptly. We quote forging billets at $45 for sizes up to but not including 10 x 10 in. and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 and up to 0.60 carbon take $1 per ton extra. Axle billets are held at $38 to $40.

Ferroalloys.—Deliveries of English ferromanganese on contracts are being made promptly, and there does not seem to be much uneasiness among consumers as to the future supply. English 80 per cent ferromanganese is being offered at $90 to $100 per ton, seaboard. A sale of 300 tons, equal deliveries over November, December and January, is reported at the lower price. Domestic 80 per cent ferromanganese is also offered at as low as $90 at maker's furnace. We quote 50 per cent ferrosilicon for all of 1916 delivery as follows: Up to 100 tons, $85; up to 600 tons, $84, and over 600 tons, $83, delivered in the Pittsburgh district. Prices on Bessemer ferrosilicon are very firm as follows: 9 per cent, $22; 10 per cent, $23; 11 per cent, $24; 12 per cent, $25; 13 per cent, $26.50; 14 per cent, $28.50; 15 per cent, $30.50, and 16 per cent, $33. These prices are for delivery up to April 1, 1916, and for delivery in second quarter of next year $1 per ton advance is charged. These prices are f.o.b., furnace, Ashland, Ky., Jackson, Ohio, or New Straitsville, Ohio, each of these points having a freight rate of $2 per gross ton to Pittsburgh. We quote ferrotitanium at 8c. per pound in carloads, 10c. in 2000-lb. lots and over, and 12½c. in smaller lots; ferrovanadium, $2.25 to $2.50 per pound of contained vanadium.

Plates.—Three successive advances in prices of plates have put the price to 1.60c., f.o.b. Pittsburgh, and the market is firm at that figure. Some of the smaller mills, that can make reasonably prompt shipments, are said to be getting $2 per ton advance over this price. Inquiries for cars are heavy, and two of the larger trunk lines are expected to send out inquiries soon for 20,000 cars or more. The Pressed Steel Car Company has taken 1000 steel hoppers for the Central Railroad of New Jersey. This company is also furnishing 200 box and 200 gondola cars to the Wheeling & Lake Erie. The Standard Steel Car Company has taken 4500 steel gondolas for the Pittsburgh & Lake Erie, about 4000 box cars for France and 800 steel car bodies for the Montour Railroad. The Cambria Steel Company has taken 2000 steel hoppers for the Baltimore & Ohio. The inquiry of the Pennsylvania Railroad is in the hands of the carbuilders, and is for 9000 to 9500 cars. The Pennsylvania is also in the market for 150 to 175 passenger and other kinds of coaches. It is stated that the Michigan Central is in the market for 3000 automobile cars. The steel car companies are well filled with work for some months ahead and are using very large quantities of plates, shapes and bars, on which the mills are somewhat behind in deliveries, especially for bars. There is a heavy inquiry for plates from Japan, and it is

said large shipments are being made to that country, which is understood to be building about fifty-three ocean boats, to handle the Pacific trade, presented to it by our Government. We quote ¼-in. and heavier plates at 1.60c., f.o.b. Pittsburgh, and the market is very strong.

Steel Rails.—Effective Monday, Nov. 8, prices on light rails were advanced by all makers 11c. per 100 lb., or about $2.50 per gross ton. No large orders for standard sections have been placed since the Pennsylvania order, but it is expected several other trunk lines will soon place contracts for 1916 rails. The Carnegie Steel Company is having a good demand for small lots of standard sections ranging from 500 to 1000 tons for delivery this year. The new demand for light rails is active, the local interest booking 4000 to 5000 tons per week. We quote standard section rails of Bessemer stock at 1.25c., and of open-hearth stock, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows: 25 to 45 lb. sections, 1.45c.; 16 and 20 lb., 1.50c.; 12 and 14 lb., 1.55c.; 8 and 10 lb., 1.60c., in carload or larger lots, 5c. per 100 lb. advance being charged for less than carload lots.

Sheets.—The demand for all kinds of sheets is heavy and prices are very strong. On blue annealed the American Sheet & Tin Plate Company is filled up for four to five months, on pickled for about three months, on galvanized up to first quarter, but on Bessemer black has a small tonnage to spare for this year's delivery. Another leading mill is sold up on black, galvanized and blue annealed sheets for about five months. The American Sheet & Tin Plate Company is starting this week its Leechburg sheet mill, which has been idle for a long time, and which has eleven hot sheet trains. All the makers are having trouble in getting deliveries of acids and this, with the shortage in steel, is retarding output somewhat. The sheet mills are operating from 80 to 90 per cent and some close to 100 per cent of capacity. For remainder of the year delivery we quote Nos. 9 and 10 blue annealed at 1.70c. to 1.80c.; No. 28 galvanized 3.70c. to 3.80c.; No. 28 Bessemer black, 2.15c. to 2.20c.; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26 and 25, 1.85c.; Nos. 22 and 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill.

Tin Plate.—There has been a sharp advance in prices of tin plate for early delivery, partly due to heavy demand and also to higher prices and great scarcity of sheet bars. One leading maker is filled up on specifications for the remainder of the year and other mills are running to full capacity. Reports are that $3.50 per base box has been fixed as the price for 1916 delivery, but this is not confirmed. Export demand is heavy and it is said two or three times as much tin plate could be shipped abroad as is going if vessel bottoms could be secured. Fairly large inquiries have recently come from France, India and Australia. We now quote 14 x 20 coke plates at $3.25 to $3.30 per base box for delivery over remainder of this year. Some fairly large lots have been sold for first quarter delivery to salmon packers on the coast for $3.25 per base box, f.o.b. at mill.

Structural Material.—Local fabricating shops are filled up from four to six months and are not actively bidding on new work. The Jones & Laughlin Steel Company has taken 850 tons for an addition to the Duquesne freight station in this city, and W. N. Kratzer & Co., 485 tons for the new Tod House at Youngstown, Ohio. Prices are up $2 per ton, and we now quote beams and channels up to 15 in. at 1.60c., f.o.b. Pittsburgh, for prompt acceptance only.

Carwheels.—The Pullman Company has secured an order for 2000 steel hopper cars from the Western Maryland Railroad, and it is understood that of the 16,000 wheels needed for them, half will be steel wheels and the other half cast iron. Prices on carwheels are very firm, local makers having their output sold up for four to six months. We quote 33-in. freight carwheels at $17; 33-in. tender wheels, $20; 36-in. passenger or tender wheels, $24. These prices are based on a 10-in. diameter hub, 50c. extra being charged for an 11-in. diameter hub, all f.o.b. Pittsburgh.

Railroad Spikes.—Prices have again advanced $3 per ton. The Baltimore & Ohio has closed for close to 40,000 kegs, the business being divided about equally between two local makers. Makers are well filled for three or four months. We quote standard railroad spikes at $1.85 per 100 lb. for delivery over remainder of this year and first quarter of 1916; small railroad and boat spikes, $1.95 for delivery into first quarter and $2 for second quarter, per 100 lb., f.o.b. Pittsburgh.

Cold-Rolled Strip Steel.—Prices are very strong and the demand is abnormally heavy. All the makers are running to utmost capacity and have their output sold for three to four months. Most consumers are covered by contracts placed some time ago and specifications are active. Premiums over the regular base price are readily paid for prompt delivery. We quote hard-rolled steel, 1½ in. and wider, under 0.20 carbon, sheared or natural mill edge, per 100 lb., $3.25 delivered. Extras, which are standard among all mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate tempers	Extras for straightening and cutting to lengths not less than 24 in.
0.100 and heavier	Base	$0.25	$0.10
0.099 to 0.050	$0.05	0.25	0.15
0.049 to 0.035	0.20	0.25	0.15
0.034 to 0.031	0.35	0.40	0.25
0.030 to 0.025	0.45	0.40	0.40
0.024 to 0.020	0.55	0.40	0.50
0.019 to 0.017	0.85	0.50	1.10
0.016 to 0.015	1.25	0.50	1.10
0.014 to 0.013	1.95	0.50	1.25
0.012	2.30	0.50	coils only
0.011	2.65	0.50	coils only
0.010	3.00	0.50	coils only

Skelp.—The new demand is more active, and, owing to the scarcity and high prices of steel, skelp has also advanced. We now quote grooved steel skelp at 1.60c. to 1.65c.; sheared steel skelp, 1.70c. to 1.75c.; grooved iron skelp, 2c. to 2.05c., and sheared iron skelp, 2.10c. to 2.15c., all delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—Export and domestic demand for rods is heavy. Large inquiries from France, England, South America and Australia are in the market for first half delivery, but local mills cannot quote on these as they do not have the rods to spare. Some large domestic inquiries are also in the market for first quarter and first half. Prices are very strong and we quote Bessemer, open-hearth and chain rods at $35 to $36, maker's mill.

Wire Products.—Reports are that an advance of $2 per ton in wire products will be made this week. The domestic and foreign demand for wire nails and barb wire is extraordinarily heavy and the mills are filled with orders for three to four months. On some contracts the mills are promptly canceling all unshipped portions not specified for in each month. Heavy shipments of barb wire are being made to Russia and England for which considerably more than domestic prices is being secured. The domestic demand is most active and for reasonably prompt deliveries premiums of $2 to $3 per ton over regular prices are being offered by consumers. Prices in effect at this writing are as follows: Wire nails, $1.85; galvanized nails 1 in. and longer taking an advance over this price of $1.75, and shorter than 1 in., $2.25; plain annealed wire, $1.70; galvanized barb wire and fence staples, $2.70; painted barb wire, $2; polished fence staples, $2, all f.o.b., Pittsburgh, with freight added to point of delivery; terms sixty days net, less 2 per cent off for cash in ten days. Prices on woven wire fencing are 68½ per cent off list for carload lots, 67½ per cent for 1000-rod lots, and 66½ per cent for small lots, f.o.b., Pittsburgh.

Rivets.—Export and domestic demand for rivets continues very heavy and prices are strong. Two local makers of rivets are making heavy shipments to France, South America and elsewhere abroad. One recent shipment was three carloads to South America. Another advance in prices of rivets is looked for. We quote buttonhead structural rivets at $2.25 and cone-

head boiler rivets at $2.35 in carload lots, per 100 lb., f.o.b. Pittsburgh, smaller lots bringing about 10c. advance, and for delivery this year only.

Hoops and Bands.—Another advance has been made in prices of bands, which are now quoted at 1.60c., Pittsburgh, with the market very firm. Mills report that most consumers are covered and specifying heavily against contracts. Steel hoops are very strong at 1.75c., and likely to be higher. We quote steel bands at 1.60c., with extras as per the steel bar card, and steel hoops at 1.75c., f.o.b., Pittsburgh.

Iron and Steel Bars.—Prices on steel bars have again been advanced $2 per ton, but without the effect of shutting off the demand, which continues heavy. There is no abatement in the demand for steel rounds, which have sold at 3c. or higher, and local mills have about all of this class of work they can turn out in the next three or four months. The local steel-bar mills report they are sold up for four or five months on every pound they can make and are back in deliveries from 8 to 10 weeks. We quote steel bars at 1.60c. for delivery through first quarter; refined iron bars, 1,50c. to 1.55c., and railroad test bars, 1.60c. to 1.65c., in carload lots, f.o.b., Pittsburgh, the usual advances being charged for small lots.

Shafting.—Another advance of $3 per ton has been made in prices of shafting, with makers reporting they are sold up for four to six months. Specifications are heavy and all the makers are back in deliveries from six to eight weeks. We now quote cold-rolled shafting at 55 per cent off in carloads, and 50 per cent in less than carloads, f.o.b. Pittsburgh.

Merchant Steel.—In sympathy with other lines of finished products, prices are very strong and are about $2 per ton higher. The demand is heavy and all the mills are back in deliveries six weeks or longer. On small lots we quote: Iron finished tire, ½ x 1½ in. and larger, 1.80c. base; under ½ x 1½ in., 1.95c.; planished tire, 2c.; channel tire, ¾ to ⅞ and 1 in., 2.30c. to 2.40c.; 1 x ⅛ in. and larger, 2.70c.; toe calk, 2.40c. to 2.50c., base; flat sleigh shoe, 2.15c.; concave and convex, 2.20c.; cutter shoe, tapered or bent, 2.70c. to 2.80c.; spring steel, 2.40c. to 2.50c.; machinery steel, smooth finish, 2.20c.

Merchant Pipe.—Mills report the new demand for merchant pipe heavier than for some months. No large gas or oil lines are in the market, as it is too late to start outside work. Prices on oil country goods have been advanced by all the makers $2 per ton. A further advance in prices of black iron and steel pipe is looked for in a short time. Discounts now in effect are given on a previous page.

Boiler Tubes.—The new demand for boiler tubes is very heavy, one leading maker stating that it has four months' work ahead. The higher prices on steel and charcoal iron tubes, adopted Oct. 30, and given on a previous page, are reported as being firmly held.

Nuts and Bolts.—Export shipments are very active and most makers of nuts and bolts have orders ahead for five to six months. Yet the new demand continues very heavy. Prices are strong and likely to be higher. Discounts in effect at this writing are as follows: Common carriage bolts, ⅜ x 6 in., and shorter and smaller, rolled thread, 75 & 10; cut thread, 75 & 5; larger or longer, 70. Machine bolts with h. p. nuts, ⅜ x 4 in., and shorter and smaller, rolled thread, 75, 10 & 5; cut thread, 75 & 10; larger or longer, 70 & 5. Machine bolts with c. p. c. t. and r. nuts, ⅜ x 4 in., and shorter and smaller, 70, 10 & 10; larger or longer, 65 & 10. Forged set screws and tap bolts, 45 & 5. Rough stud bolts, 65 & 10. Lag screws (cone or gimlet point), 80. Square nuts, h. p., tapped or blank, $5.40 off list; hexagon, $5.70 off; c. p. c. t. and r. nuts, tapped or blank, square, $4.80 off; hexagon, ⅝ in. and larger, $6.25 off; plain c. p. square nuts, $4.70 off; plain hexagon nuts, $5 off; semi-finished nuts, 80, 10 & 5. Rivets, smaller than ½ in. in diameter, 75, 10 & 10. All the foregoing prices are f.o.b. Pittsburgh, subject to an actual freight allowance not to exceed 20c. per 100 lb. on shipments of 300 lb. or more.

Coke.—While the new demand for prompt blast-furnace coke has quieted down, prices are reported fairly steady and high grades for prompt shipment are bringing close to $2.50 per ton, with some grades offered at $2.25 per ton. A local interest has bought 15,000 tons per month of high grade furnace coke, running low in sulphur, for delivery over the first six months of 1916, at $2.50 per net ton at oven. We also note a sale of 8000 tons of high grade furnace coke per month for November and December at $2.50 per net ton at oven. Several large inquiries for blast-furnace coke for first half of 1916 are in the market. We quote standard makes of prompt blast furnace coke at $2.50; on contracts for first half of next year, $2.50, and for all of next year, $2.25 to $2.35 per net ton at oven. Prices on 72-hr. foundry coke are higher, and we note sales of 15 to 20 cars at $3 per net ton at oven. On contracts for first half of 1916, best grades of foundry coke are held at $2.75 to $3 per net ton at oven. The output of coke in the upper and lower Connellsville regions for the week ended Oct. 30 was 432,519 net tons, an increase over the previous week of 4200 tons.

Old Material.—The market on scrap of all kinds is very strong and prices on steel-making scrap are higher. We note sales of 8000 to 10,000 tons of heavy steel scrap to dealers and consumers in the Pittsburgh district at $15.50 to $15.75, delivered. A Youngstown open-hearth steel interest bought last week 20,000 to 25,000 tons of selected heavy steel scrap at $15.50 and $15.75, delivered, with reports that $16 was paid for part of it. The heavy steel scrap in the Pennsylvania Railroad list brought $15.50, delivered at Steubenville and Alliance, Ohio. Most dealers are not anxious to sell, believing that prices on scrap, in sympathy with Bessemer and basic pig iron, will be higher. Prices on nearly all grades of steel scrap are up from 50c. to 75c. per ton. An embargo on scrap routed to the Pittsburgh Steel Company at Monessen, Pa., has been declared. Dealers quote for delivery in the Pittsburgh and nearby districts that take the same rates of freight, as follows, per gross ton:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$15.50 to $15.75
Compressed side and end sheet scrap	13.50 to 13.75
No. 1 foundry cast	13.50 to 13.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	12.00 to 12.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	15.25 to 15.50
No. 1 railroad malleable stock	13.25 to 13.50
Railroad grate bars	9.75 to 10.00
Low phosphorus melting stock	19.50 to 20.00
Iron car axles	20.50 to 21.00
Steel car axles	19.00 to 19.50
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	12.50 to 12.75
Machine shop turnings	8.50 to 8.75
Old carwheels	13.00
Cast-iron borings	9.50 to 9.75
*Sheet bar crop ends	14.00 to 14.50
Old iron rails	14.00 to 14.50
No. 1 railroad wrought scrap	14.25 to 14.50
Heavy steel axle turnings	10.75 to 11.00
Heavy breakable cast scrap	12.50 to 12.75

*Shipping point.

Chicago

CHICAGO, ILL., Nov. 9, 1915.

The condition into which the mills have been brought through the remarkably rapid accumulation of tonnage became, last week, more definitely apparent. Opening the week with further advances in prices, duplicating those of the preceding week and bringing the market for the principal steel products to the basis of 1.789c., Chicago, producers found even this an inadequate measure and now all quotations have been withdrawn by leading interests. Not since 1907 has so high a level of prices prevailed. In addition to the higher quotations on shapes, plates and bars from both mill and stock, advances are announced for blue annealed and black sheets, high carbon bars, hoops, spikes, track bolts and light rails. Pig iron is a notch higher and scrap prices are moving upward rapidly. But more important than the question of prices is the problem of securing raw material. Carbuilders, with inquiry in

hand and in prospect for thousands of cars for which the greater part of their second quarter manufacturing capacity is available, see little hope of securing the necessary steel. Business of much less magnitude is even now facing a like shortage. Particular interest attaches to the fact that the tonnage on the mill books represents only a moderate degree of domestic activity. And apparently the adjustment of the situation waits upon circumstances over which industry in this country is exercising little control.

Pig Iron.—Another 50c. has been added to the price of foundry and malleable Bessemer iron at Chicago furnace, and $17 now appears to be the hard and fast quotation. Southern iron has risen to a $14 Birmingham basis, and Virginia irons, of which there was a considerable tonnage sold in this market, in the interval in which the Vrginia quotation was favorable, are now held at $18.50, Chicago, the last sale being at $18. Charcoal iron also appears to have become firmly established on the new basis of prices, following liberal sales. A steady flow of inquiry is calling for consideration, although the individual tonnages are not large. While local furnaces are well sold up through the first half, there naturally remain opportunities for working in limited tonnages for almost any delivery, and current furnace bookings are largely of this sort, with little but attractive business finding takers. In an increasing degree, the higher silicon irons are commanding a premium. Only a limited tonnage of silvery iron appears to be available at our quotations, and for Bessemer 10 per cent ferrosilicon $24 to $26 is asked. We have revised our prices, and the following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$16.75
Lake Superior charcoal, No. 1	17.25
Lake Superior charcoal, No. 6 and Scotch	17.75
Northern coke foundry, No. 1	17.50
Northern coke foundry, No. 2	17.00
Northern coke foundry, No. 3	16.50
Southern coke, No. 1 f'dry and 1 soft	18.50
Southern coke, No. 2 f'dry and 2 soft	18.00
Malleable Bessemer	17.00
Standard Bessemer	18.50
Basic	16.50
Low phosphorus	$27.00 to 27.50
Silvery, 8 per cent	22.00
Silvery, 10 per cent	23.00

Rails and Track Supplies.—That the railroads are fully awake to the possibilities which are being developed in the present steel situation, affecting the delivery of steel, is amply evidenced in the almost feverish activity of purchasing departments. With the exception of two important transcontinental routes, one of which, located advantageously with respect to the Duluth mill, is now considering its rail requirements, there has been a liberal covering for rails, spikes, bolts, tie plates and angle bars to an extent which now finds probable needs largely provided for. Recent buying of tie plates, in particular, has been noted, and the price has been advanced to $34. Spikes went to 1.75c. and as quickly to 1.80c., with later quotations still higher. Track bolts are now quoted as high as 2.35c., and a second advance of $1.80 has been made in light rail quotations within a fortnight. Inquiry for light rails from coal mine operators is noticeably heavier. We quote standard railroad spikes at 1.80c. to 1.90c., base; track bolts with square nuts, 2.25c. to 2.35c., base, all in carload lots, Chicago; tie plates, $34, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base, open hearth, 1.34c.; light rails, 25 to 45 lb., 1.34c.; 16 to 20 lb., 1.39c.; 12 lb., 1.44c.; 8 lb., 1.49c.; angle bars, 1.50c., Chicago.

Structural Material.—The mills appear to have adjusted themselves, only within the past few days, to the remarkable inflow of orders which followed upon the recent announcement of car purchases. The estimate of 250,000 tons of car steel likely to be placed appears to have been more than realized, while other users of structural material, eager to protect themselves against possible limitations of supply, added largely to this total. There is scarcely a mill which has an open quotation on structural material, either with respect to price or delivery. Carbuilders, it is reported, have notified railroads that while they expect to have capacity available in the second quarter for building cars, they are as yet unable to secure steel for the purpose. While a reckoning may later clarify the situation and develop mill capacity available for the acceptance of additional tonnage, there now appears to be little or no steel to offer in the first half. Further inquiry for cars includes 2000 for the Missouri, Kansas & Texas, 1000 for the Chicago & Western Indiana, an additional 5000 for Russia and the Pennsylvania's 10,500. The Northern Pacific is in the market for center sills. The Western Pacific has placed 1000 cars with the Pullman Company. In building lines the scarcity of new projects would hardly be surmised from the size of plain material contracts recently closed by fabricators. The Minneapolis Steel & Machinery Company has taken two contracts for fabricated material, totaling about 425 tons. Hansell-Elcock Company has a small job, and 405 tons for a Chicago & Northwestern elevator at Milwaukee was divided between the Worden-Allen and the Milwaukee Bridge companies. The important tonnage of the week for fabrication was 10,000 tons for the new Duluth & Iron Range ore dock, which was placed with the American Bridge Company. The Duluth, Missabe & Northern Railway is rushing specifications for a new steel and concrete ore dock at Duluth. There are practically no outstanding mill quotations on plain material, some of the mills formally announcing their withdrawal from the market. The last quotations appear to have been quite generally made upon the basis of 1.60c., Pittsburgh, and we quote for Chicago delivery of plain material from mill 1.789c.

Under the present conditions the demand for steel out of stock is an indication of business activity in normal channels, and it is interesting to note that store tonnage is moving less rapidly, by quite a margin, than during previous periods in which mill deliveries have been comparable with those now existing. The advance in steel out of stock, announced last week, has been followed by a similar advance of $2 per ton, and we quote for Chicago delivery 2.20c.

Plates.—While there is probably less congestion with respect to sheared plates than is true of universal mill plates, the outstanding fact is the scarcity of semi-finished steel, and prices rule alike for both. It is commonly reported that carbuilders experienced no little difficulty in placing business ordinarily of the most desirable character, while premium prices have been offered to mills as an inducement in connection with considerable business normally attractive both as to specifications and tonnage. Where quotations can be secured at all, the market seems to offer nothing better than 1.789c., Chicago.

A second advance of $2 per ton in store price for plates has been announced, and we quote for Chicago delivery 2.20c.

Sheets.—The lethargic attitude which so long characterized the activities of sheet users apparently was not sufficiently quickened to prevent a general overstaying of the market, particularly in view of the demand for semi-finished steel and sheets for intrenchment purposes abroad. Sheet users, in particular, are finding in the present mill situation occasion for complaint. Quotations for blue annealed are now on the basis of 1.80c., Pittsburgh; one pass black sheets, 2.25c., and galvanized 3.75c. to 3.80c. We quote for Chicago delivery from mill, No. 10 blue annealed, 1.989c.; No. 28 black, 2.439c.; No. 28 galvanized, 3.989c.

Jobbers' prices for blue annealed sheets and black sheets have been advanced another $2 a ton and we quote for Chicago delivery from jobbers' stock as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 2.40c.; No. 28 black, 2.75c.; No. 28 galvanized, 4.35c.

Bars.—Specifications against bar-iron contracts at 1.35c., or lower prices, are being received by the mills in such volume as to make possible heavier operations than have obtained for a considerable period. Occasional evidence of the substitution of iron bars for steel appears, and the situation apparently is making toward an increase in tonnage, attributable to this reason. While the general scarcity of building projects

has limited the inquiry for reinforcing bars, the 4000 to 5000 tons of this material which is now required for the Union Depot construction and the proposed Northwestern elevator is being offered, it is reported, without takers. The price of hard steel bars has been advanced $2 per ton, and though the demand for this material is not heavy even the hard steel bar-mill capacity is being conserved for possible rolling of mild steel. The price of shafting has been advanced five points, new mill discounts being quoted at 58 per cent. We quote mill shipments, Chicago, as follows: Bar iron, 1.45c.; soft steel bars, 1.789c.; hard steel bars, 1.50c.; shafting, in carloads, 58 per cent off; less than carloads 53 per cent off.

Store quotations for bars have been advanced $2 a ton and we quote store prices for Chicago delivery: Soft steel bars, 2.10c.; bar iron, 2.10c.; reinforcing bars, 2.05c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 48 per cent off.

Rivets and Bolts.—Announcement is made of higher prices for all sizes of bolts and nuts, and we have revised our quotations accordingly. Rivet prices are subject to a variation which represents the attitude of makers, ranging from normal eagerness for business to complete indifference, and our quotation of 2.25c., Pittsburgh, is therefore in a measure nominal. We quote as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 75-10; cut thread, 75-5; larger sizes, 70; machine bolts up to ⅜ x 4 in., rolled thread, with hot pressed square nuts, 75-10-5; cut thread, 75-10; larger sizes, 70-5; gimlet point coach screws, 80; hot pressed nuts, square $5.40 off per cwt.; hexagon, $5.70 off per cwt. Structural rivets, ¾ to 1¼ in., 2.25c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.40c.; boiler rivets, 2.50c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ¾ x 6 in., 75-10; larger sizes 70-15 off; hot pressed nuts, square, $6, and hexagon, $6.70 off per cwt.

Old Material.—Continued advances in the price of all grades of scrap are to be explained more by the influence of general conditions than by any activity of consumers in buying, although the market is not lacking in interest on the part of melters. Activity, however, is largely on the part of dealers whose viewpoint is indicated by the fact that materials, changing hands among them, have generally brought prices from 25c. to 50c. above the consumers' market. Trading strongly reflects the bullish sentiment which pervades the situation. Competition for scrap offered by the railroads has been especially keen, and, in a number of instances, extravagant prices have been paid. Strength is especially manifested in steel scrap. New railroad offerings of old material include 1400 tons from the Northern Pacific, 1800 tons from the Omaha, 2000 tons from the Wabash, 2500 tons from the Michigan Central and 2000 tons from the Milwaukee, exclusive of 1500 car-wheels. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$14.50 to $15.00
Relaying rails	19.50 to 20.50
Old carwheels	13.00 to 13.50
Old steel rails, rerolling	14.25 to 14.50
Old steel rails, less than 3 ft	14.00 to 14.25
Heavy melting steel scrap	12.75 to 13.25
Frogs, switches and guards, cut apart	12.75 to 13.25
Shoveling steel	12.50 to 12.75
Steel axle turnings	9.50 to 10.00

Per Net Ton

Iron angles and splice bars	$14.75 to $15.25
Iron arch bars and transoms	15.50 to 15.75
Steel angle bars	11.50 to 12.00
Iron car axles	17.75 to 18.25
Steel car axles	18.75 to 19.25
No. 1 railroad wrought	12.25 to 12.75
No. 2 railroad wrought	11.50 to 12.00
Cut forge	11.50 to 12.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	8.00 to 8.25
Pipes and flues	9.00 to 9.50
Steel knuckles and couplers	12.25 to 12.75
Steel springs	13.25 to 13.50
No. 1 boilers, cut to sheets and rings	9.50 to 10.00
Boiler punchings	12.00 to 12.25
Locomotive tires, smooth	12.00 to 12.50
Machine shop turnings	7.50 to 8.00
Cast borings	6.50 to 7.00
No. 1 cast scrap	11.75 to 12.25
Stove plate and light cast scrap	9.50 to 10.00
Grate bars	9.25 to 9.75
Brakeshoes	8.75 to 9.00
Railroad malleable	11.00 to 11.25
Agricultural malleable	10.00 to 10.50

Wire Products.—Any reflection of demand in the wire trade upon prices seems certain to be indicated by further advances, and already higher quotations have been made on some business. Except for the fact that customers' specifications have generally been kept within the probable limits of actual requirements, the domestic trade has not appeared to be seriously hampered by the tremendous foreign demand. Quotations to jobbers, per 100 lb. are as follows: Plain wire, No. 9 and coarser, base, $1.889; wire nails, $2.039; painted barb wire, $2.189; galvanized barb wire, $2.889; polished staples, $2.189; galvanized staples, $2.889, all Chicago.

Cast-Iron Pipe.—The business in cast pipe in this territory is very light and generally limited to small tonnages. An inquiry at Belleville, Ohio, for 410 tons and 350 tons at Melrose Park, Ill., are noted and at East Liverpool, Ohio, 2000 tons has been placed through a contractor. Prices for pipe have been advanced $1 per ton. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $29; 6 in. and larger, $27, with $1 extra for class A water pipe and gas pipe.

Philadelphia

PHILADELPHIA, PA., Nov. 9, 1915.

The volume of demand on the steel mills continues to swell and there is seen the peculiar spectacle of sellers asking consumers to cut down their specifications instead of enlarging them. More mills are practically out of the market so far as new business is concerned, though they are taking care of their customers. It is conceded that the railroads, which now are seeking many products, overstayed the market. Under the circumstances it is not strange that prices are extremely irregular, or that fancy premiums are offered. Not only are eastern Pennsylvania mills making their own prices, but inquiry for shapes has come to this territory from the West. The larger mills quote 1.60c., Pittsburgh, or 1.759c., Philadelphia, for plates, shapes and bars, but ask higher prices for anything out of stock. One mill will not quote on any product, several will not quote on billets, another is filled with steel rounds; still another is filled to April with steel bars, its forging plant is filled for four months, and it is practically out of the market on structural shapes. Export inquiries are more diversified and call for material other than that needed for war purposes. The need of more steel is stimulating plans for enlarging production capacity. The betterment in pig iron is sustained, though there is no rush in the demand. At the same time, a Virginia producer has withdrawn from the market, and another has advanced its quotations. The old material market has a better tone, principally because of increased inquiry for small lots.

Pig Iron.—The betterment in foundry irons is maintained, although there is yet room for improvement for which some furnace representatives are waiting. The Virginia furnaces appear to be in an enviable position so far as orders go. One practically has withdrawn from the market, as it will be taxed to fill the contracts now on its books for delivery this year and in the first quarter of next. Another, which has only No. 2 plain to offer, yesterday announced a further advance of 50c. on all deliveries, making its new quotations $14, furnace, for this year's delivery, $14.75 for first quarter, and $15 for second quarter. One brand of eastern Pennsylvania No. 2X is offered at $16.79, Philadelphia, and another at $17.09. Some of the larger inquiries before the trade follow: A Lynchburg, Va., interest has inquired for 12,000 tons, to be comprised of four lots of as many grades of pipe iron, 3000 tons of each. A nearby locomotive works is about to close for 2000 to 4000 tons of what it terms floor grade, about equivalent to No. 2 soft, and containing 2.50 to 3.25 per cent silicon, delivery to be at the rate of 250 tons weekly, beginning Nov. 29, also 1500 to 3000 tons of cylinder grade, about equivalent to No. 4 foundry, containing 1.15 to 1.50 per cent silicon, delivery to be at the rate of 200 tons weekly, beginning Nov. 22. A Reading hardware company has an inquiry out for 1000 tons of

No. 1X, first half delivery. A Delaware carwheel company wants 1000 tons, of which 400 tons is for delivery this year and 600 tons in the first quarter; also 300 tons of manganese iron. In the hands of the trade, also, are a goodly number of small inquiries which make up a fair aggregate. Basic for delivery in eastern Pennsylvania has been quiet, but there has been interest shown in this market by consumers in other territories, notably New England. The demand for standard low phosphorus continues extremely good, and one sale of 5000 tons was made at a price close to $29, delivered. Lebanon low phosphorus has been sold at $26.50, furnace, and up to $27 is quoted. Quotations for standard brands, delivered in buyers' yards, shipment this year, range about as follows:

Eastern Penna., No. 2 X foundry	$16.75 to $17.25
Eastern Penna., No. 2 plain	16.50 to 17.00
Virginia, No. 2 X foundry	17.25
Virginia, No. 2 plain	16.25 to 17.00
Gray forge	15.50 to 15.75
Basic	17.00 to 17.50
Standard low phosphorus	29.00 to 30.00

Iron Ore.—No foreign ore arrived at this port in the week ended Nov. 6. Trading in such ores at this time is a business of many uncertainties.

Ferroalloys.—All of the local representatives of English makers of ferromanganese continue to quote $100, seaboard, for 80 per cent material, but there is no doubt as to this price having been shaded from 50c. to $2. On the other hand, an English maker declined to accept an order for 300 tons, forward delivery, at $100 per ton. Sellers are puzzled over the persistent talk of concessions in price and most of them believe that a domestic product is involved. The quotations for 50 per cent ferrosilicon are $85 to $87, Pittsburgh, according to quantity. An arrival at this port last week consisted of 335 tons of ferromanganese from England.

Bars.—With some of the leading makers of steel bars declining to quote on the ground that they have none to sell, it is difficult to get at the exact market. These mills, however, are taking care of their regular customers, in view of which they expect their reward when the present flood tide of business passes. Large mills are not taking any orders for prompt shipment at less than 1.60c., Pittsburgh, or 1.759c., Philadelphia, and where they sell from stock they ask around 2c. Contracts are not wanted. Iron bars are active at 1.55c., Pittsburgh, or 1.709c., Philadelphia. A Baltimore company is looking for 1750 tons of 1½-in. cold-rolled steel rods, and 450 tons of 1¼-in. cold-rolled steel rounds. The demand for steel rounds suitable for shell work is greater than ever. An important mill is filled up and turning down business. The quotations for rounds range from 3c. to 3.50c.

Plates.—Some eastern Pennsylvania mills are asking a substantial premium over the prices quoted by both nearby and Western makers. Some of the latter are quoting 1.60c., Pittsburgh, or 1.759c., Philadelphia, but the makers first referred to ask 1.959c., Philadelphia, on small orders and 1.859c. on choice propositions. Carbuilding is contributing heavily to the plate demand. The Standard Oil Company has placed another ship with the Newport News Shipbuilding & Dry Dock Company. It will require 4000 tons of plates and an equal tonnage of shapes.

Structural Material.—Inquiry from the West for structural shapes is taken to reflect the crowded state of the mills in that part of the country. The minimum quotation by mills in eastern Pennsylvania is 1.859c., Philadelphia, while on miscellaneous lots 1.85c., Pottsville, is quoted, deliveries to Philadelphia taking a freight rate of 1.16c. per 100 lb. Inquiries are piling in from all directions. Inquiry is out for 800 to 900 tons of material to be used in the electrification of the Chestnut Hill branch of the Pennsylvania Railroad. Contractors are bidding on a high school at Lebanon, Pa., which will take 600 tons. The Eastern Steel Company will supply 180 tons for an extension to the Adam Schiedt Brewery at Norristown, Pa. As in plates, carbuilding and shipbuilding are creating a heavy demand, while there also is a good aggregate of small lots pending. The Baltimore & Ohio Railroad has closed for 10,000 tons of shapes, plates and bars.

Rails.—No new orders are reported by mills here, although the placing of about 80,000 tons of 67½-lb. rails for Russia is pending, and bids are to be submitted by the end of the month on 100,000 tons for France. The railroads are freely buying frog and switch equipment and some of them are desirous of contracting into the first half for such material. Street railroads, contrary to their practice, are inquiring for girder rails to be delivered several months hence. For its general requirements the Baltimore & Ohio Railroad has placed orders for 20,000 to 30,000 kegs of spikes.

Billets.—Producers who have ceased selling billets have been offered up to $60 for them. The market is so irregular that small lots of rerolling open-hearth billets are quoted all the way from $35 to $55, delivered. Nominally the quotation is $32 for open-hearth rerolling billets, with forging billets $36 to $40, but the prices of the latter run much higher, also. A limited quantity of Bessemer rerolling billets is to be had.

Sheets.—The demand shows no diminution. No. 10 blue annealed are quoted at 1.859c. to 1.959c., Philadelphia.

Coke.—Good business has been done in furnace coke, one deal being closed for 11,000 tons for early shipment, and another calling for 28,000 tons, deliveries to be at the rate of 4000 tons a month, December to June. Other deals are pending. Prices are irregular. Local agents are quoting $2.75 to $3 per net ton at oven for prompt furnace and $2.50 to $2.75 for contract furnace. Prompt foundry is quoted at $3.25 per net ton at oven, and most of the producers are unwilling to go into next year. Concessions of about 25c. from these quotations are possible. The freight rates from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—There is a notable improvement in the inquiry for small lots of miscellaneous grades and the tone of the market is better. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking in freight rates from 35c. to $1.35 per gross ton, are as follows.

No. 1 heavy melting steel	$14.50 to $15.00
Old steel rails, rerolling	15.50 to 16.00
Low phos. heavy melting steel scrap	20.00 to 20.50
Old steel axles	21.00 to 22.00
Old iron axles	22.00 to 23.00
Old iron rails	17.50 to 18.00
Old carwheels	14.00 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Wrought-iron pipe	13.50 to 14.00
No. 1 forge fire	12.00 to 12.50
Bundled sheets	11.50 to 12.00
No. 2 busheling	9.50 to 10.00
Machine shop turnings	10.00 to 10.25
Cast borings	10.00 to 10.50
No. 1 cast	14.00 to 14.50
Grate bars, railroad	10.50 to 11.00
Stove plate	10.50 to 11.00
Railroad malleable	10.50 to 11.00

Cincinnati

CINCINNATI, OHIO, Nov. 10, 1915.—(*By Wire.*)

Pig Iron.—The somewhat sensational advances on silvery irons have attracted a great deal of attention, to-day's quotation on 8 per cent silicon ranging from $21 to $22 at furnace for this year's shipment. This is an advance of practically $8 per ton over last year's prices at this time. More silvery iron has changed hands in the past six weeks than is generally known. The latest sale reported covers 800 tons to a Michigan buyer for last half shipment. Foundry iron business has experienced a temporary lull and few open inquiries are being figured on. There is also a somewhat limited tonnage of both Southern and Northern foundry iron being contracted for under cover. It is generally known that a large number of foundry iron consumers have bought a supply sufficient to run them through the first quarter and in many instances through the first half of next year. There is also a let up in the number of nearby shipment orders received. Prices are very strong, and while there is some prompt Southern No. 2 foundry iron obtainable at $13, Birmingham basis, the quantity is limited and the majority

of sales are on a higher level. As far as can be ascertained, nothing less than $13.50 can be done for first half shipment. Northern foundry, malleable and basic are very firm at $16, Ironton, for any shipment before July 1, although it is practically impossible to contract for basic iron for any nearby movement. The charcoal irons continue active, and we note a sale of 1000 tons to a Michigan melter and it is rumored that other interests in this territory have contracted for future requirements. General inquiries include one from Indiana for approximately 500 tons of Southern foundry iron to be shipped in the next five months and a southern Ohio consumer wants a like quantity for first half. It is known that basic users have been for some time quietly feeling the market for a last half supply, but no one is willing to sell so far ahead. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	$16.40 to $16.90
Southern coke, No. 2 f'dry and 2 soft.	15.90 to 16.40
Southern coke, No. 3 foundry	15.40 to 15.90
Southern No. 4 foundry	14.90 to 15.40
Southern gray forge	14.40 to 14.90
Ohio silvery, 8 per cent silicon	22.26 to 23.26
Southern Ohio coke, No. 1	18.26 to 18.76
Southern Ohio coke, No. 2	17.26 to 17.76
Southern Ohio coke, No. 3	17.01 to 17.26
Southern Ohio malleable Bessemer	17.26 to 17.51
Basic, Northern	17.26 to 17.51
Lake Superior charcoal	17.70 to 18.70
Standard Southern carwheel	24.40 to 24.90

(*By Mail*)

Coke.—Quotations in all districts are seeking a higher level. Producers' agents are quoting Connellsville 48-hr. coke around $2.75 to $3 per net ton at oven and 72-hr. coke from $3 to $3.50, although some future contracts for furnace coke could be made at lower figures. Wise County, Pocahontas and New River furnace and foundry grades are practically the same as the figures given above, but New River foundry coke is somewhat firmer than previous quotations and it is stated that $3.50 has been inserted in several contracts. No extensive buying of either furnace or foundry coke has taken place the past week, but there is some fill-in business that will make a fairly satisfactory total tonnage as far as foundry coke is concerned.

Finished Material.—Advances have been made on practically all kinds of finished products. The nearby mills are asking 3.80c., Pittsburgh basis, for No. 28 galvanized sheets and from 2.25c. to 2.35c. for No. 28 black. The local jobbers' quotation on No. 28 galvanized sheets has been marked up to 4.35c. Steel bars from warehouse stocks are quoted at 2.10c. and small structural shapes at 2.20c. The local warehouse quotation on rounds and squares, 2 in. and over in diameter, is now $3 per ton over the price of smaller sizes. This advance is said to be less than one-half that asked by many Eastern jobbers. Quotations received to-day on small structural shapes and steel bars are around 1.55c. to 1.60c., Pittsburgh. Cincinnati store quotations on wire nails range from 1.95c. to 2c. Practically all kinds of finished material are in active demand.

Old Material.—Large quantities of steel scrap are being bought by the rolling mills, while the foundries are also taking a fair sized tonnage of cast. One prominent firm states that its business in the past 30 days has been far ahead of any similar period in its existence. Prices are unchanged but very firm. The minimum figures given below represent what dealers are willing to pay for delivery in their yards, southern Ohio, and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap	$9.50 to $10.00
Old iron rails	13.25 to 13.75
Relaying rails, 50 lb. and up	21.00 to 21.50
Rerolling steel rails	12.25 to 12.75
Heavy melting steel scrap	11.25 to 11.75
Steel rails for melting	11.25 to 11.75
Per Net Ton	
No. 1 railroad wrought	$10.25 to $10.75
Cast borings	6.75 to 7.25
Steel turnings	6.25 to 6.75
Railroad cast scrap	10.75 to 11.25
No. 1 machinery cast scrap	12.25 to 12.75
Burnt scrap	7.75 to 8.25
Old iron axles	16.50 to 17.00
Locomotive tires (smooth inside)	10.50 to 11.00
Pipes and flues	8.00 to 8.50
Malleable and steel scrap	9.25 to 9.75
Railroad tank and sheet scrap	7.25 to 8.50

Buffalo

BUFFALO, N. Y., Nov. 9, 1915.

Pig Iron.—Inquiry continues in good volume, with sales about 17,000 tons of all grades. Most furnaces, however, report that sales for the week have not been as large as the average weekly total for a number of weeks, owing, undoubtedly to a realization on the part of buyers of the sold-up condition of furnaces. On account of this furnacemen are more insistent that customers anticipate and specify their deliveries when making contracts. This is necessary because the situation has reached a point where they must know the delivery dates as well as the price involved, in order to determine whether they will be able to take on the tonnage desired. This is the first time a similar condition has appeared in this market, with possibly a single very brief exception, since 1907. The indications are this will continue for a long period, as the leading producers are sold up practically solid over the remainder of the year and through the first quarter, and furthermore are quite comfortably filled well into the second quarter. One of the large producers has withdrawn from the market for the present and is not quoting at all. The price situation is extremely strong, and all grades have been advanced 50c. per ton; $16 at furnace is now the minimum for any grade, and no iron is now obtainable under that figure. No. 2X commands $16.50; No. 1 foundry, $16.75 to $17, and 4 to 5 per cent silicon foundry iron, $17.50, with higher percentages of silicon selling at $20. There has also been a further advance in the price of charcoal iron. Daily shipments on contracts continue to be exceedingly heavy. We quote as follows for current and first quarter delivery, f.o.b. furnace, Buffalo:

Foundry of 4 to 5 per cent silicon	$17.50
No. 1 foundry	$16.75 to 17.00
No. 2 X foundry	16.50
No. 2 plain	16.00
No. 3 foundry	16.00
Gray forge	16.00
Malleable	16.50
Bessemer	16.50 to 17.00
Basic	16.50 to 17.00
Charcoal—regular brands and analysis	18.00 to 19.00
Charcoal—special brands and analysis	21.00 to 22.00

Finished Iron and Steel.—Demand is rising steadily for all finished products, but comparatively few sales are being made because manufacturers of hot metal steel products are practically sold up to the middle of next year and are unable to take on additional orders, except to apply against existing contracts. Many producers are not in position to consider new business until after the first of the new year, at which time steel products can be sold for shipment during third and fourth quarters. Most of the sales agencies have instructions not to accept any new business without full conference with their home office on each order. All sellers are now holding to 1.60c., Pittsburgh, for bars, shapes and plates, to which figure prices were advanced the latter part of last week. Cold-rolled shafting has been advanced to 55 per cent off on carload lots and 50 per cent off on less than carloads, an advance of ten points since July 29. Standard railroad spikes have advanced to 1.85c., base; boat spikes and 7/16 and ½-in. railroad spikes to 1.95c., and 5/16 and ⅜-in. to 2.10c. Blue annealed and black sheets have also been advanced, and contracts have been taken for large tonnages for next year's delivery. In tin plate, mill books have not yet been opened for business into next year. It is expected, however, that heavy tonnages will be sold during the latter part of this or next month. Warehouse prices have again been advanced; bars, except rounds and squares, 2 in. and over, and small shapes now being held at 2.20c., base; rounds and squares, 2 in. and over, 2.55c., base; structural shapes and universal mill and sheared plates, 2.30c., base; hoops, 2.70c., 5c. per 100 lb. being added for "store-door" delivery. Wrought pipe has advanced $2 and boiler tubes $4 per ton. Bids are being taken this week for a chemical building for the Schoellkopf Aniline & Chemical Works, Inc., Buffalo, requiring 100 tons of steel; and the T. H. Symington Company, Rochester, is taking bids for foundry addition requiring 100 tons steel. The Ferguson Steel & Iron Company, Buffalo, is to furnish 500 tons for a

new factory building for the General Railway Signal Company, Rochester, for which the John W. Cowper Company, this city, has the general contract. The Buffalo Structural Steel Company will furnish steel for the Sterling Engine Company's plant addition, Buffalo; for an addition to the boiler shop and foundry for Farrar & Treffts, Buffalo, and for a warehouse for the Utica Heater Company, Utica, each requiring a small tonnage.

Old Material.—The market is strong, with large demand, particularly for heavy melting and low phosphorus steel, the former showing an advance of 25c. per ton in price. Inquiries for cast scrap and old carwheels are also being received in large volume, with price advances in each commodity in sympathy with the upward tendency in the price of pig iron. Dealers expect that the price of these commodities will follow pig iron closely from now on. The price of stove plate, No. 1 railroad wrought scrap, wrought pipe, bundled sheet scrap and heavy axle turnings has been advanced 50c. per ton, and the entire list presents a strong front, with the exception of machine shop turnings, in which the excessive production tends to keep the price down, with no prospect of a material advance. We quote dealers' asking prices, per gross ton, f.o.b., Buffalo, as follows:

Heavy melting steel	$13.50 to $14.00
Low phosphorus steel	18.00 to 18.50
No. 1 railroad wrought scrap	13.00 to 13.50
No. 1 railroad and machinery cast	13.75 to 14.25
Old steel axles	19.00 to 19.50
Old iron axles	19.50 to 20.00
Old carwheels	13.50 to 14.00
Railroad malleable	13.00 to 13.50
Machine shop turnings	6.50 to 7.00
Heavy axle turnings	10.50 to 11.00
Clean cast borings	7.50 to 7.75
Old iron rails	16.00 to 16.50
Locomotive grate bars	10.50 to 11.00
Stove plate (net ton)	9.00 to 9.50
Wrought pipe	11.00 to 11.50
Bundled sheet scrap	10.00 to 10.50
No. 1 busheling scrap	11.00 to 11.50
No. 2 busheling scrap	9.50 to 10.00
Bundled tin scrap	10.00

Cleveland

CLEVELAND, OHIO, Nov. 9, 1915.

Iron Ore.—The recent demand has enabled shippers to dispose of about all their previously unsold ore on Lake Erie docks, some of which has been there several years, and this ore will no doubt all be cleaned up within the next few weeks. For ore on docks where a storage charge is made buyers are required to pay it also, thus making a premium price for the buyer. One Ohio furnace has an inquiry out for approximately 100,000 tons, with a view of blowing in an idle stack, but so far has been unable to secure the ore because boats cannot be had to bring it down the Lakes. Additional sales of several hundred thousand tons could have been made the past month had vessels been available to haul the ore. The bulk of the ore that is now coming down is being sent direct to the furnaces and some shipments are being made from the docks. Although Lake shipments to Nov. 1 were more than 10,000,000 tons greater than last year, there was on the docks Nov. 1 only 36,000 tons more ore than on the same date in 1914. Stocks on Lake Erie docks Nov. 1 were 8,333,781 tons. Ore receipts for Lake Erie docks in October were 5,639,389 tons, making a total up to Nov. 1 of 32,898,234 tons. We quote prices as follows delivered to lower Lake ports: Old range Bessemer, $3.85; Mesaba Bessemer, $3.45; old range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—The demand for foundry iron is quite active and prices are very firm locally and higher in the Mahoning Valley. The Otis Steel Company has purchased 10,000 tons of basic from Cleveland furnaces for first quarter delivery. We note several sales of foundry iron in lots up to 1000 tons in the Cleveland territory at $16 at furnace for No. 2. One local interest has advanced its price to $16.50. Some of the Valley furnaces have advanced prices on foundry iron to $16 and report sales at that price, although $15.50 iron has probably not disappeared entirely. Cleveland producers are asking $16 for basic. Several small lot sales of Southern iron are reported, mostly for first half. While some early shipment Southern iron can still be had at $13 for No. 2, $13.50 is the minimum price for delivery next year and some producers are holding for $14. There is scarcely any Ohio silvery iron to be had for early shipment and as a result prices have advanced sharply. On small lot inquiries for early delivery quotations as high as $21 and $23 at furnace have been made for 8 per cent iron. We quote, delivered Cleveland, as follows:

Bessemer	$16.95 to $17.45
Basic	16.30
Northern No. 2 foundry	16.30
Southern No. 2 foundry	17.00 to 17.50
Gray forge	15.80
Jackson Co. silvery 8 per cent silicon	21.62 to 22.62
Standard low phos., Valley furnace	26.00

Coke.—Some foundries are having trouble in getting coke as needed and are buying spot coke to fill out. Prices are very firm, ranging from $2.75 to $3.25 per net ton at oven for standard makes. Furnace coke is quoted at about $2.75 for prompt shipment and $2.50 for contract.

Finished Iron and Steel.—All mills have advanced prices on steel bars, plates and structural material to 1.60c., Pittsburgh, and are avoiding as much as possible the taking on of additional business, some being so crowded that they are refusing further orders. Consumers are finding it impossible to secure extended protection on steel for work on which they are figuring. The demand continues heavy, and with consumers it has become a question of delivery and not of price. There is still considerable inquiry for contracts. Eastern mills are quoting plates up to 1.75c., Pittsburgh, for early shipment. Some Bessemer sheet bars have sold at $27, Youngstown, for early delivery and the same price is being quoted for the first quarter. Forging billets have been sold at $42, Eastern mill, or about $43.50, Pittsburgh, for the first quarter. For early shipment, some quotations are around $50 for higher carbons, but few mills can take orders at any price. The demand for sheets is very active and prices are firm. We quote black sheets for prompt shipment at 2.20c. at mill, for No. 28; blue annealed, 1.70c. to 1.80c. for No. 10, and galvanized at 3.70c. to 3.80c. for No. 28. Some of the mills are asking 1.90c. to 2c. for blue annealed sheets for the first quarter and 2.25c. and higher for black sheets. Bar iron is firm at 1.50c., Cleveland. Warehouse business is very heavy and some orders are being placed for carload lots and over for steel bars out of stock. Warehouse prices have been advanced $3 per ton on steel bars, plates and structural material, or to 2.25c. for steel bars and 2.35c. for plates and structural material. The stock price on rounds and squares, 2 in. and larger, has been advanced $5 per ton to 2.50c. The warehouse price on blue annealed sheets has been advanced to 2.40c. and on hoops to 2.65c. Hoop steel is very scarce, particularly pickled and limed stock.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is heavy and recent advances are being maintained. In view of the steel situation, makers are not eager to take on first quarter contracts. The demand for rivets is very great, and large consumers are placing contracts at the recent advance, while makers are refusing to take contracts beyond the first quarter. The export demand is strong, particularly from Russia and Greece. We quote rivets at 2.25c., Pittsburgh, for structural and 2.35c. for boiler rivets. Bolt and nut discounts are as follows: Common carriage bolts, ⅝ x 6 in., smaller or shorter, rolled thread, 75 and 10 per cent; cut thread, 75 and 5, larger or longer, 70; machine bolts with h.p. nuts, ⅝ x 4 in., smaller or shorter, rolled thread, 75, 10 and 5; cut thread, 75 and 10, larger and longer 70 and 5; lag bolts, gimlet or cone point, 80; square h.p. nuts, blank or tapped, $5.40 off the list; hexagon h.p. nuts, blank or tapped, $5.70 off; c.p.c. and T-square nuts, blank or tapped, $4.80 off; hexagon nuts, all sizes, $6.25 off; cold pressed semi-finished hexagon nuts, all sizes, 80, 10 and 5 off.

Old Material.—The market is very firm and fairly active. Youngstown mills have taken considerable steel-making scrap the past few days. With an advancing market, dealers do not want to sell much material. Steel car axles have again advanced from

$1 to $2 per ton, some offers being made at $22 per gross ton. Heavy melting steel has advanced 25c. per ton in the local market and several other grades are 25c. to 50c. per ton higher. For Youngstown delivery, heavy melting steel scrap is quoted at $14.75 to $15. We quote, f.o.b. Cleveland, as follows:

	Per Gross Ton
Old steel rails	$13.75 to $14.00
Old iron rails	14.50 to 15.00
Steel car axles	21.00 to 22.00
Heavy melting steel	13.25 to 13.50
Old carwheels	12.00 to 12.25
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	11.50 to 12.00
Railroad malleable	13.50 to 13.75
Steel axle turnings	11.50 to 12.00
Light bundled sheet scrap	11.75 to 12.00

	Per Net Ton
Iron car axles	$17.25 to $17.75
Cast borings	6.75 to 7.00
Iron and steel turnings and drillings	6.25 to 6.50
No. 1 busheling	11.50 to 11.75
No. 1 railroad wrought	12.75 to 13.25
No. 1 cast	11.25 to 11.75
Railroad grate bars	9.50
Stove plate	9.25 to 9.50

Birmingham

BIRMINGHAM, ALA., Nov. 8, 1915.

Pig Iron.—Another advance of 50c. has been made. At the close of last week the leading interest was alone in offering $13.50 iron, the active interests having advanced to $14 and the remaining one adhering to the advance for customer protection. The tendency is still higher. Following sales of 115,000 tons by the Sloss-Sheffield Company in October and up to Nov. 5 and over 60,000 tons in the same period by the Republic Company, inquiry and business continue brisk. The leading interest is now credited with having considerable iron to sell and will doubtless book well ahead at its $13.50 minimum. The Sloss-Sheffield Company led in the advance to $14 in the first few days of the month and the Republic marked up its price Nov. 6. Prior to that time both the Republic and the leading interest were selling for 1916 as well as spot at $13.50. On Saturday last a firm offer of $13.50 for 4000 to 6000 tons for second quarter delivery was declined and $14 asked. A small amount at the latter figure for 1916 delivery had been booked by Saturday. Sales at $13.50 by one maker during the week approximated 7000 to 10,000 tons. None as low as $13 has been heard of since Nov. 2. Charcoal iron has also sustained an advance, being held now at a minimum of $22. The enormous production in Alabama in October, 212,000 tons, was 25,000 tons in excess of any prior month's output, and November will go still higher. As showing vastly superior furnaces and methods now in Alabama, the output of 212,000 tons was made by 24 stacks, as compared with 186,000 tons in March, 1913, by 25 stacks. The No. 1 furnace of the Republic Company at Thomas, Ala., made a new high record in October, the output being 10,132 tons, which was 500 tons more than in any prior period of similar length. Stocks are rapidly diminishing in spite of the large production, and are no longer to be considered. One interest still has none, while another will have none by Jan. 1 if delivery of metal ordered is made. A representative of the leading steel interest reports that it has more than it can do. The enormous output of iron and steel, the constantly growing payrolls and general industrial activity are breaking all records. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$14.00 to $14.50
No. 2 foundry and soft	13.50 to 14.00
No. 3 foundry	13.00 to 13.50
No. 4 foundry	12.75 to 13.25
Gray forge	12.50 to 13.00
Basic	13.50 to 14.00
Charcoal	22.00 to 22.50

Cast-Iron Pipe.—Local pipe manufacturers report the reception of a satisfying lot of orders the past week and see steady operations ahead. A large Cuban contract is expected to be landed in the near future. Quotations on a basis of $23 for 4-in. pipe last week were made subject to advance without notice. Another advance has really set in. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., $23.50; 6-in. and upward, $21.50, with $1 added for gas pipe.

Coal and Coke.—Coal prices are firmer. Domestic mines are busy and steam coal has improved, but there is room for much more betterment in the coal trade. It is estimated that hydroelectric power in Alabama, as at present developed, has taken a business of 1000 tons of coal per diem from the mines. Cotton seed oil mills are not as busy as usual on account of the short supply of seed. Coke continues active. We quote, per net ton, f.o.b. oven as follows: Beehive furnace, $2.75 to $3; beehive foundry, $3 to $3.25, with two brands selling at $3.50; by-product furnace, $2.50 to $2.75; by-product foundry, $2.75 to $3.

Old Material.—The feeling is much better and prices have advanced in some directions. Machine cast and steel scrap are quite active. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$14.50 to $15.00
Old steel axles	14.00 to 14.50
Old iron rails	13.50 to 14.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	9.50 to 10.00
No. 1 country wrought	9.00 to 9.50
No. 1 machinery cast	10.00 to 10.50
No. 1 steel scrap	10.00 to 10.50
Tram carwheels	10.00 to 10.50
Stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, MO., Nov. 8, 1915.

Pig Iron.—Purchases of small lots in the week have been very numerous, while there have also been a considerable number of larger purchases, including one of 1000 tons of No. 2 Southern foundry, one of 6000 tons of Northern basic, 500 tons of No. 2 Northern foundry, 1400 tons of No. 3 Southern foundry, 300 tons of Lake Superior charcoal carwheel iron, 800 tons of Northern high silicon, and possibly 6000 or 7000 tons in the aggregate of small lots in addition to those mentioned. Outstanding are inquiries for 5000 to 10,000 tons of basic and 400 tons of Lake Superior charcoal carwheel iron. There is an increasing request for hurrying or advancing of shipments. No. 2 Southern foundry is very firm at $13.50 last quarter and $14 first half, Birmingham basis. Charcoal irons were marked up $1 per ton.

Coke.—Beyond a sharp stiffening of the prices of bee-hive coke, the sale of some small lots of special brands for immediate delivery and the accentuation of demand for shipments under contracts there was little new.

Finished Iron and Steel.—The only question at issue is that of delivery. The new price of 1.60c., Pittsburgh, is accepted without objection on the part of consumers. There is still a disposition to avoid contracting for future delivery. Structural material generally has been in good demand. The expected placing of about 2000 cars by the Missouri, Kansas & Texas receiver is likely to call for 20,000 tons of material of various kinds. Standard section steel rails have been inactive save for a sale of 500 tons to a southeast Missouri road, but another Missouri, Kansas & Texas purchase is expected shortly. Light rails are in fair demand. The extended deliveries on contracts for finished material are augmenting the pressure on warehouses. We quote for stock out of warehouse as follows: Soft steel bars, 2.15c.; iron bars 2.10c.; structural material, 2.25c.; tank plates, 2.25c.; No. 10 blue annealed sheets, 2.35c.; No. 28 black sheets, cold rolled, one pass, 2.80c.; No. 28 galvanized sheets, black sheet gage, 4.30c.; the advances becoming effective with Tuesday's business.

Old Material.—Scrap has moved sharply upward under the impetus of decreasing supplies together with larger demand not alone from the North and East, but from local industries as well. The steel demand has been particularly good and the local industries are beginning to buy, though all the embargoes have not been lifted as yet. Rolling mill and foundry grades are also wanted and dealers are beginning to hold for advances. Little if any of the St. Louis & San Francisco and the Missouri Pacific scrap is coming into the local market, having been largely taken by the Colorado Fuel & Iron Company, which outbid local dealers by about $1 per ton. Altogether all the present indications favor further advances aside from those noted in the quotations given.

We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	$13.00 to $13.50
Old steel rails, re-rolling	13.00 to 13.50
Old steel rails, less than 3 ft	13.50 to 14.00
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	11.50 to 12.00
No. 1 railroad heavy melting steel scrap	12.75 to 13.25
Heavy shoveling steel	11.25 to 11.75
Frogs, switches and guards cut apart	12.50 to 13.00
Bundled sheet scrap	8.00 to 8.50

Per Net Ton

Iron angle bars	$12.50 to $13.00
Steel angle bars	11.25 to 11.75
Iron car axles	16.50 to 17.00
Steel car axles	17.00 to 17.50
Wrought arch bars and transoms	15.00 to 15.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.75 to 11.25
Railroad springs	11.75 to 12.25
Steel couplers and knuckles	11.50 to 12.00
Locomotive tires, 42 in. and over, smooth inside	12.25 to 12.75
No. 1 dealers' forge	9.50 to 9.75
Mixed borings	7.00 to 7.50
No. 1 busheling	9.75 to 10.25
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 railroad cast scrap	10.75 to 11.25
Stove plate and light cast scrap	8.50 to 9.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	8.00 to 8.50
Pipes and flues	8.00 to 8.50
Railroad sheet and tank scrap	7.75 to 8.25
Railroad grate bars	7.75 to 8.25
Machine shop turnings	7.50 to 8.00

San Francisco

SAN FRANCISCO, CAL., Nov. 2, 1915.

Local requirements show little increase, and while buyers manifest considerable anxiety to protect themselves against further price advances, they are not desirous of increasing the tonnage actually on hand. Some lines of work, such as shipbuilding, are active; but building is slow to revive, and general development work is quiet. The export trade in steel for many transpacific ports holds up well. Local prices, both for direct shipment and resale, are advancing about on a parity with those in the East.

Bars.—The jobbing trade in local territory is improving a little, but is not active, and a large proportion of the material is furnished by local mills, though some sizes are still coming from the East. Numerous foreign inquiries continue to appear, and the business is distributed among several manufacturers. Prices have advanced sharply, jobbers' carloads from the Steel Products Company's warehouse being quoted at 2.15c., while the local mills are asking about 2c. The resale price on small lots is 2.50c., a substantial advance over the price at which present stocks were purchased. In fact, there are still several hundred tons of German bars on hand, purchased last year at about 1.35c.

Structural Material.—Nothing of special interest has appeared, either as to contracts or new inquiries. Shipbuilders are taking a fair tonnage of shapes. For direct shipment 1.45c., Pittsburgh, is the best that can be done, and beams and channels for prompt delivery from local warehouse are held at 2.25c.

Rails.—Standard sections are still very quiet, but several good-sized sales of light rails have been reported lately, and the outlook is fairly encouraging. A new road, it is said, will soon be undertaken by the Oregon, California & Eastern, and a large tonnage will be required for the rehabilitation of the Southern Pacific lines in Mexico. The Patterson & Western is preparing to build a mining road from Patterson, Cal.

Plates.—Contracts for several ships, requiring in all quite a heavy tonnage, have been received by Pacific coast plants, and material is still arriving on old jobs. Current requirements of the tank and boiler shops, however, are rather light. A good many contracts are said to have been placed for delivery next year, at an advance over the present price. Jobbers' carloads from the local warehouse are quoted at 2.15c.

Sheets.—There is still a moderate movement of corrugated, but otherwise the market is dull, and merchants are replenishing their light stocks only in a very limited way. Prices, however, are extremely firm in all lines. All orders for galvanized have to be put up to the mills, and the resale price here is on the basis of 2.75c., Pittsburgh. On black, 2.10c. Pittsburgh, is about the best that can be done, and some mill agents are asking as high as 2.20c.

Wrought Pipe.—The past month has been a good one for oil-country goods, at least as compared with the summer season. This is attributed mainly to duplication of orders for pipe needed quickly to replace shipments held up at Panama; though there seems to be a little more demand in the oil fields. It is reported that the General Petroleum Company will build a 30-mile line of 6-in. pipe between Bear Creek and Lost Hills. The smaller sizes of pipe receive little atttention, merchants merely keeping their stocks sorted up.

Cast-Iron Pipe.—A little more corporation buying is noted than for some time, but mainly in small lots, while municipal business is inactive. The city of Los Angeles has placed new orders aggregating about 1200 tons, and 400 tons additional has been sold in that vicinity. Redwood City has ordered about 50 tons, and Sausalito, Cal., is in the market for a small lot. Prices tend upward, being quoted at $32 per net ton for 6-in., $34 for 4-in., and $1 extra for class A and gas pipe.

Pig Iron.—The larger melters have for the most part provided for their requirements well into the coming year, and current business is limited to actual needs, which are still light. Offerings of foreign iron are very moderate, however, and most of the business is on Southern grades. Some fair sales are reported in the Puget Sound district. No. 1 Southern foundry iron is quoted here at $23 to $24 per net ton.

Coke.—A sailing vessel arrived early this month with 800 tons of foundry and 1200 tons of gas coke from England. So far as can be learned there is nothing more due in the near future, and it is impossible to get a line on the tonnage purchased to arrive next spring and summer, though it is believed to be considerable. Numerous contracts have also been placed for Eastern and Southern coke, but current purchases are light. Prices for the latter are higher, ranging from $14.75 to $15.25 per net ton; while foreign coke from local yards is quoted at $15 per net ton.

Old Material.—The local open-hearth plants continue busy, and the demand for steel scrap shows a gradual increase. Some of the dealers look for further advances, and are asking prices far above the present market, but $9.50 per gross ton is about the highest that has yet been paid, and some scrap is still moving at $7. Cast-iron scrap remains at $14 to $15 per net ton, with only moderate demand.

New York

NEW YORK, Nov. 10, 1915.

Pig Iron.—Demand is increasing and furnaces that are well sold up, particularly one group in the Buffalo district, are asking distinctly higher prices. In the past week nearly all furnaces selling in Eastern districts have made advances of 25c. to 50c. in their minimum prices. The Connecticut malleable interest which was in the market one week ago is believed to have closed, though the amount is not known, its inquiries in most cases being for 1000 to 5000 tons. This buyer was covered for months ahead at its rate of melting prevailing early in the year, but that rate has increased greatly. Another Connecticut consumer, which has the advantage of water deliveries, is believed to have bought all or the greater part of 3500 tons for November and December delivery. A New Jersey foundry which has been in the market for 2400 tons for first quarter has closed for nearly all of this. A Newark foundry has inquired for 3000 tons for the second quarter, one-half each No. 2 X and No. 2 plain. Another New Jersey foundry has bought 1000 tons of low and high silicon irons for the first half. A stove foundry in the Hudson Valley is in the market for a tonnage over and above what was counted on for this year and the first quarter of 1916. The entire Buffalo situation has been strengthened by the large sale of hot metal for steel making,

reported last week. At eastern Pennsylvania furnaces the minimum low price for No. 2 X has now generally advanced to $16 and $16.50 is asked by some. Virginia furnaces have been rather slower than those in other districts to make advances. For No. 2 X they are now asking $15. The leading producer, which is out of the market on No. 2 X, asks $14.50 for No. 2 plain, $14.25 for No. 3 and $14 for gray forge for this year. To these prices 25c. is added for first quarter and first half and 50c. for second quarter. Some inquiry has come up in this market for the second half of next year. A New England wire company, which has been inquiring for 5000 tons of basic iron, is believed to have closed for this. We quote Pennsylvania irons at tidewater as follows for fourth quarter delivery: No. 1 foundry, $17.25 to $17.75; No. 2 X, $16.75 to $17.25; No. 2 plain, $16.50 to $16.75. Buffalo No. 2 X at tidewater, $17.85 to $18.35. Southern iron at tidewater, $17.50 to $17.75 for No. 1 and $17.25 to $17.50 for No. 2 foundry and No. 2 soft.

Ferroalloys.—An inquiry for 1200 tons of ferromanganese for delivery in the first quarter, also one for 900 tons, are before the market, as well as others for smaller lots. Sales of small quantities up to 100 to 150 tons for early delivery are reported at the uniform price of $100, seaboard. There is no shading of this price in this market, despite rumors of sales elsewhere as low as $98, seaboard. Receipts of British ferromanganese are acknowledged to be on a scale equal to those of the past three or four months, which is about 50 per cent of normal. A cargo of Cuban manganese ore of 2000 tons has been unloaded recently. Spiegeleisen continues in active demand at $29, furnace. Ferrosilicon, 50 per cent, is very active and harder to get, one broker being out of the market for some time to come.

Structural Material.—Mills are beginning to feel that the rapidly advancing price movements of finished steel tend to give an incorrect impression of the condition in respect to structural shapes. They are not in demand to the same extent as bars and wire, for example, and some sizes are obtainable in a few weeks and at prices slightly below quotations for bars. The under capacity of steel, it is admitted, has made it difficult for some companies to promise early deliveries but demand for shapes in the immediate future does not assume embarrassing proportions. There are signs that high prices are discouraging speculative building plans and only moderate amounts are expected from the railroads, though the increasingly better railroad earning showings are expected in a few months to start engineering work which has been checked for a long time. With labor well occupied there are no political reasons of pushing public building work and so besides consumption for ships and railroad cars, most demand is looked for from industrial plant expansion. Such mills as took tonnage contracts are meeting with heavy specifications and as some of these represent material as much as $8 above present Pittsburgh quotations, it is not surprising that some fabricators have collected something of a stock out of which they may, if need be, sell as a distributor. Besides the railroad offerings, which include 1000 tons for the Baltimore & Ohio, 700 tons for the Lehigh Valley and 650 for the Southern, steel plant extensions look conspicuous with 2000 tons for the Alan Wood Iron & Steel Company, placed with McClintic-Marshall Company, 1100 tons for a new mill building for Lukens Iron & Steel Company and six open-hearth furnaces to be added to the Worth Brothers plant. Some 2500 tons has been closed for the Boston & Maine, most of this awarded to the Phoenix Bridge Company. The 21-story Public Service Corporation office building in Baltimore, involving 4500 tons, has advanced to the stage where the George A. Fuller Company has secured the general contract. Dietrich Brothers have 700 tons for the Emerson apartments in Baltimore. The New York Telephone Company will erect a 300-ton building on West 175th Street. One of the industrial projects closed is that for the Winchester Repeating Arms Company, New Haven, 250 tons, awarded to Lewis F. Shoemaker & Co. Prices of plain material have advanced $1 to $2 per ton from both mill and warehouse, the latter maintaining close to the $12 per ton differential which has been holding for some time. For mill shipments we quote 1.55c. to 1.60c., Pittsburgh, to which is added 0.169c. for freight, for the delivered New York price. Not much is obtainable this year, but for a lot attractive from the mill standpoint, for delivery as the mill can make it, 1.50c., Pittsburgh, appears possible in one or two instances. Otherwise purchases must be made from warehouses with prices of 2.20c. to 2.25c., New York.

Steel Plates.—Following the abrupt advance of $2 per ton reported last week, is to be noted another of $2, making the quotations from Eastern mills 1.70c., Pittsburgh. Similarly Pittsburgh mills have advanced $2, or to 1.60c. but not for prompt deliveries, which do not appear possible in these cases. Little or no business has been reported at the 1.70c. basis, but plate business is relatively not heavy in this territory. Export quotations are also made at 1.70c., Pittsburgh. The most interesting development is the closing with the Standard Oil Company by J. J. Mulcahy, manager of sales in New York for the Worth Brothers Company, of 20,000 tons for the first half. Buying of cars is showing no let-up and the heavy commitments of the railroads in this respect in the last few weeks bear out abundantly the forecast made in this column as long ago as July 15. The Pennsylvania's purchases now bid fair to reach 20,000 freight cars and 175 passenger cars; the New York Central's now appear to approach 15,000, as the Standard Steel Car Company alone has closed for 8000 to 9000 cars for this system, and an important line in the Middle West is expected to buy close to 10,000 cars. Other cars pending total between 7000 and 8000. Plates are obtainable at 1.70c., Pittsburgh, or 1.869c., New York, in about four weeks, with a quotation of 1.60c., such as that named by Pittsburgh mills, some time in early 1916. For plates from store, the quotation is 2.20c. to 2.25c., New York.

Iron and Steel Bars.—Both steel and iron bars are higher, both being quoted at 1.60c., Pittsburgh, or $2 per ton above last week's minimum. The result has not been heavier demands on the mills, as this had reached a maximum. The rush, there is increasing evidence, is resulting in stock accumulation by both distributor and manufacturing consumer, such is the highly speculative value of the material. What this may mean some time later no guess is hazarded, as few believe stocks will get or remain heavy. The other picture of market conditions is the constant refusal of attractive foreign business, chiefly because of impossibility of meeting shipping dates. More than one mill has had a chance at 26,000 tons for France, in only three sizes, for delivery this year and at no less than $15 per ton above the regular market. Wire in large tonnage amounts is bandied about without exciting comment. One sale of a moderate tonnage of galvanized wire may be noted at 3½c. We quote mill shipments of steel and iron bars at 1.769c. to 1.819c., New York. We quote shipments out of warehouse at 2.15c. to 2.20c., New York.

Cast-Iron Pipe.—The opening of bids Nov. 4 at New Bedford, Mass., on 971 tons of principally 30-in. pipe showed that the manufacturers are maintaining prices at recent levels. The extreme variation in bidding was but $1 per ton and the contract was awarded to the Donaldson Iron Company at $25.80 per net ton, delivered, for the 30-in., and $27.10 for the 10, 8 and 6-in. As this business was very desirable, the character of the bidding is noteworthy. On Friday, Nov. 12, the Department of Water Supply, Gas and Electricity of the City of New York will open bids for 275 tons of 8-in., and on the evening of the same day South Orange, N. J., will receive proposals for a small quantity. No other municipal lettings are in sight in this immediate vicinity. A great many inquiries are being received from private buyers. Large consumers, among them important gas companies, are coming into the market for their requirements for next spring. Prices are rising because of the higher cost of pig iron. Carload lots of 6-in., class B and heavier, are now quoted at $26.50 per net ton, tidewater, class A and gas pipe taking an extra of $1 per ton.

Old Material.—No large transactions are reported but an increasing demand is observed for small lots from a larger number of buyers. Business of this character is spread over almost the entire list of commodities. The steel companies drawing supplies from this locality are receiving deliveries on contracts so rapidly that their yard facilities are becoming taxed and they are requesting dealers to hold back shipments to some extent. Steel scrap and rolling-mill stock appear in abundant supply, yet prices are not only well held but on some commodities show notable strength. Steel axles are in continued good demand for export, and sales are reported as high as $25 alongside ship, New York. An export inquiry is in the market for steel rails for remelting, which is expected to result in a good sized order. Brokers are paying about as follows to local dealers and producers, per gross ton, New York:

Old girder and T rails for melting	$12.25 to $12.50
Heavy melting steel scrap	12.25 to 12.50
Relaying rails	19.50 to 20.00
Rerolling rails	13.50 to 14.00
Iron car axles	22.00 to 22.50
Steel car axles	23.00 to 24.00
No. 1 railroad wrought	14.00 to 14.50
Wrought-iron track scrap	13.00 to 13.50
No. 1 yard wrought, long	12.75 to 13.00
No. 1 yard wrought, short	12.25 to 12.50
Light iron (nominal)	4.00 to 4.25
Cast borings	7.50 to 7.75
Wrought turnings	7.50 to 7.75
Wrought pipe	11.00 to 11.25

An active demand for cast scrap is coming from not only foundries in this immediate vicinity but from various points in New England. Prices thus far have not shown much advance, notwithstanding the higher prices prevailing for pig iron. Dealers' quotations to consumers of cast scrap are as follows, per gross ton, New York:

Old carwheels	$12.00 to $12.50
No. 1 cast (machinery)	12.75 to 13.00
No. 2 cast (heavy)	11.75 to 12.00
Stove plate	10.00 to 10.25
Locomotive grate bars	9.25 to 9.75
Malleable cast (railroad)	10.00 to 10.50

British Market Higher

American Steel Scarce—Active Italian and French Inquiry

(*By Cable*)

LONDON, ENGLAND, Nov. 10, 1915.

The foundry pig-iron trade is firm and all conditions appear to be shaping toward further general advances in prices as well as increasing premiums asked for forward deliveries. Prices for hematite iron are fully maintained, with very little available. Furnaces in blast are 162 against 160 a year ago. Stocks of pig iron in Connal's stores were 130,097 tons at the close of last week compared with 130,071 tons one week previous.

There is active inquiry for France and a growing demand from Italy for billets and sheet bars, but makers are indisposed to entertain further business and prices quoted show wide variations. Iron and steel plants generally are working under government control and merchant business is gradually disappearing. Welsh workmen will work week ends. Material from America is very difficult to obtain owing to the congestion of works and scarcity of ocean freight. Galvanized steel and tin plates are quiet, and the position entirely depends on prices at which makers can obtain steel. We quote as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 20s., against 19s. 6d. last week.

Cleveland pig-iron warrants, 68s. 1½d., against 67s. 7½d. a week ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 68s. 6d., compared with 67s. 9d. a week ago.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £13 5s., compared with £12 15s. last week.

Steel ship plates, Scotch, delivered local yards, £10 10s., against £10 5s. a week ago.

Steel rails, export, f.o.b. works port, £8 17s. 6d.

Hematite pig iron, f.o.b. Tees, 120s., compared with 115s. a week ago.

Sheet bars (Welsh), delivered at works in Swansea Valley, £8 10s.

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £12.

Steel bars, export, f.o.b. Clyde, £12 15s., compared with £12 10s. last week.

Ferromanganese, f.o.b., £20 15s.

Ferrosilicon, 50 per cent, c.i.f., £24 to £25.

(*By Mail*)

The Hematite Situation—Maximum Steel Output Probably Reached

LONDON, ENGLAND, Oct. 21, 1915.—All conditions indicate a hardening in prices, though demand for foundry iron is still anything but active. The trade is very much interfered with by the scarcity of labor and by the interruption of exports to the European Continent, while the shipping trade from the Tees to Scotland is still suspended owing to naval conditions. The Cleveland market is very sluggish, but the tendency in the Midlands has recently improved, and a number of brands there which a few weeks ago were very hard to sell have stiffened and in some cases furnacemen report a distinct improvement. Consumers have been holding back from placing orders and the process of replenishing has not been accomplished yet. The tone at the quarterly meeting of Iron Masters, held in Birmingham a few days ago, was very strong, Midland brands of pig iron advancing very sharply, assisted by an upward movement in coke.

The main interest centers upon hematite, which has advanced because of increasing buying, dearer ore, and a big upward movement in freights owing to the difficulty in securing tonnage from Spain. The makers of hematite iron are convinced that there must be an enormous amount of buying by the steelmakers, many of whom have sold their entire output for the first half of next year, without having covered themselves for hematite. At the same time many of the hematite furnaces have not yet purchased the needed ore, and it is puzzling to know how matters are going to develop, for industrial operations become every day more and more difficult. Possibly the hematite iron makers who have neglected their opportunities and also the steelmakers, may expect the Government to help them out when the time comes for them to complete their contracts. Demand for hematite has improved lately, both for the home trade and for export. This week as much as 34s. 6d. has been paid c.i.f. Tees for good grade low phosphorous ore, and it is doubtful whether contracts for Rubio could be done at any better figure.

Prices in finished steel are higher owing to increasing costs of raw material, fuel and labor. The best quality of Staffordshire bars has advanced 10s. a ton, making the price £12 10s., compared with £9 at the beginning of the year and also at this time last year. Common bars are in excellent request, but makers find it difficult to make deliveries, while hoops and strip are firm with quite as much business offering as makers care to undertake.

Semi-finished steel is steadily firming up, with decidedly more inquiry from consumers. Buying has become difficult because American material is no longer available, with the old sources of supply in Belgium and Germany closed. The Government here appears to have intimated to the Welsh steelmakers that they will require them to provide not less than 4000 tons of shell steel a week for the remainder of the war. Hampered as these works already are by the lack of labor, this will involve a further radical disturbance of commercial business, and there has been almost a scramble among the tin-plate and galvanized sheet makers to place orders so that prices have advanced sharply for plates and sheet bars, and may go higher. The Welsh steelmakers have been particularly hard hit by the war because so much of their output is absorbed by the local tin-plate and galvanized sheet works. At one time they were quoting prices far below those at which makers in other parts of the country were able to sell. A radical adjustment is now in

progress, and it is doubtful whether much business could be done to-day at below about £8 a ton delivered locally.

The finished steel trade is becoming of lessening importance because works are filled with Government orders, with no sign of any modification in this. Sectional material of all kinds is very strong, and an enormous demand for ship plates and structural material is looked for as soon as works can see ahead a little. The steelmakers are now beginning to declare that the maximum production in this country has been reached.

German Trade Less Active

BERLIN, Oct. 20, 1915.

As production in the iron industry increases, a moderate change in the market situation is coming about. Mills that cater to the ordinary requirements of the market are no longer so pressed with work as they were up to about two months ago and the upward tendency of prices has for the most part been checked. With one exception, all prices controlled by a trade organization were left unchanged for the final quarter of the year. The exception is wire and its products, where an advance of 10 marks ($2.38) was adopted. The Steel Works Union about a month ago voted to leave unchanged all classes of semi-manufactured material, as well as structural shapes, and the Pig Iron Syndicate took similar action. Mills producing high grades of products for military purposes continue to run at their full capacity, within the limits of the reduced production in force since the war began.

The strongest demand for pig iron is in the better grades, like steel-making qualities and hematite. The following table shows a comparison of several standard grades as compared with those prevailing just before the outbreak of the war:

	Present Price, Marks	Price, June, 1914, Marks
Foundry No. 1	94	74.50
Foundry No. 3	89	69.50
Hematite	115	79.50

One mark = 23.8 cents.

Some classes of old material are in strong demand at good prices; old rails, for example, are eagerly sought at 95 marks ($22.61).

The home ore market shows great activity, with prices firm, so far as the better grades are concerned, but business in minettes, or phosphoric ores of the Lorraine-Luxemburg district, has relaxed of late owing to the fact that the amounts available did not come up to requirements. Of course, foreign ores are scarce, except Swedish, which still come in but on a somewhat reduced scale. Notwithstanding the war, the great iron companies of the lower Rhine region still show a tendency to acquire ore properties in the Siegen district in order to render themselves independent of the home and foreign market so far as possible. Both Krupps and the Rheinische Stahlwerke have recently bought ore mines there.

The least satisfactory point in the whole trade is in bars. Back in June and July some of the mills were trying to convince buyers that the minimum price would soon be fixed at 160 marks ($38.08) for ordinary basic steel bars, whereas the minimum actually in force then was 140 marks ($33.32), with some selling at higher prices. The output in bars, however, had been undergoing a steady increase for some months, among other reasons because some mills in the southwest again resumed operations, after having been closed down during the first months of the war. By the beginning of August, however, it became evident that the market position favored buyers, and since then it has been rather difficult to hold the minimum price at 140 marks. Some sales have been reported at 135 to 138 marks ($32.13 to $32.84), subject still further to a discount. As evidence of the changed position of the trade it is mentioned that mills that were a short while ago stipulating delivery periods as long as six months ahead are now pressing contractors to send in specifications on orders and to take what is awaiting shipment. Whether the price can be kept at 140 marks through the winter will depend upon the size of the orders placed by the military authorities. This changed price situation has again given a stimulus to the efforts to form a stronger organization of the trade. A meeting is to be held early in November to try to take the necessary steps.

The plate trade is active, with prices firm. The demand for heavy plates from neutral foreign countries is particularly strong.

A comparative view of the prices of various steel products now with those prevailing before the war is given in the following table:

	Prices Now, Marks	Prices in June, 1914, Marks
Ingots	102.50	82.50
Blooms	107.50	87.50
Billets	115	95
Slabs	117.50	97.50
Bars	140	96
Heavy plates	150	96
Wire stock	140	117.50

Metal Market

NEW YORK, Nov. 10, 1915.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
Nov.	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
3	18.12½	18.00	36.25	4.90	4.80	14.75	14.50
4	18.12½	18.00	36.50	5.00	4.90	15.25	15.00
5	18.12½	18.00	36.10	5.00	4.90	15.30	15.05
6	18.12½	18.12½	.....	5.00	4.90	15.50	15.25
8	18.25	18.12½	36.25	5.00	4.90	15.75	15.50
9	18.25	18.12½	36.50	5.15	5.05	16.00	15.75

Copper is firm at higher prices following heavy buying. The scarcity which is developing in spot tin is sending the market up. Lead has been active, and to-day was advanced $3 per ton. Spelter has advanced almost daily under a good demand. Antimony is quiet but higher.

New York

Copper.—Buying on foreign account was heavy last week, while domestic consumers were active also. It is estimated that on Friday last upward of 60,000,000 lb. was taken, a good part of which was for export to England and France, while the Swedish Government took a large quantity. Although the bulk of the buying was of electrolytic, Lake got its full share, and perhaps more. Both sold heavily at around 18c. One Lake producer last month sold all he can produce in four months. The trade commends the course of the producers in booking heavy business without letting prices run away. Toward the end of last week when quotations advanced to 18.12½c. cash, New York, for electrolytic and 18.25c. for Lake, the market became less active and to-day it is decidedly quiet, but firm. The exports this month total 4588 tons.

Tin.—Spot tin is becoming so scarce that it is difficult to obtain round lots. The spot quotation yesterday was 36.50c. In warehouse here there are considerable quantities but the bulk of these is owned by consumers. On the whole, the market has been quiet, although last week low prices on future shipments from the East were attractive to buyers and incited some business. As for the future, the trade is uneasy over the possibility of interrupted traffic in the Mediterranean, where several ships have recently been sunk. Banca tin is selling in this market at 12.50c. to 25c. under Straits. Perhaps the most important buyers who have been active in the past week are the independent makers of tin plate. This week the market has been rather dull. The arrivals this month total only 975 tons. The quantity afloat is 4703 tons, a good part of which is not expected to arrive until near the end of the month.

Lead.—The leading interest to-day announced an advance of $3 per ton, making its quotation 5.15c., at New York and 5.05c., St. Louis. Last Friday the quotation went up $2 per ton, or to 5c. per lb. Since the first advance referred to the market has been active, both on domestic and foreign account, and more would be done for export were it not for the difficulty of secur-

ge ocean freight space. Prior to the first advance the market looked weak and even after the 5c. quotation had been announced there was some cutting by independents. The strength shown by the leading interest is described to heavy export buying and possibly to interruptions in operations which may result in Mexico at mines which have been seized by General Villa which may curtail the English supply. The London market is firm. At the present price in New York export sales cannot be made without a sacrifice in price.

Spelter.—Business has been good in the past week and prices mounted almost daily until 16c., New York, and 15.75c., St. Louis, were quoted yesterday for prompt shipments. Deliveries in the first three months of 1916 range from 14.75c. to 15c. The brand known as Horsehead has sold well into next year at 40c. per lb. Sheet zinc was advanced last week to 16.50., f.o.b. mill, subject to the usual discounts. Extra refined prime Western has been sold at prices ranging from 25c. to 28c. Large quantities of spelter continue to go abroad, the exports for nine days of this month amounting to 1163 tons.

Antimony.—The market is quiet but firm at 36c. to 36.50c., duty paid, for Chinese and Japanese. Offerings of December shipments from the Far East have been made at 32c., c.i.f., which is about equal to 35c.

Old Metals.—The market is characterized by a fairly good demand at firm prices. Dealers' selling prices are nominally unchanged as follows:

	Cents per lb.
Copper, heavy and crucible	16.75 to 17.00
Copper, heavy and wire	16.25 to 16.50
Copper, light and bottoms	14.50 to 15.00
Brass, heavy	11.75 to 12.00
Brass, light	10.00 to 10.25
Heavy machine composition	13.50 to 14.00
No. 1 yellow rod brass turnings	12.50 to 13.00
No. 1 red brass or composition turnings	12.00 to 13.00
Lead, heavy	4.25
Lead, tea	4.00
Zinc	11.00 to 12.00

Chicago

Nov. 8.—Added strength, with further advances in prices, marked the course of the week's market. Decided activity in buying is noted. We quote: Casting copper, 18c.; Lake copper, 18.50c.; tin, carloads, 36.50c.; small lots, 38.50c.; lead, 4.95c.; spelter, nominally, 15.50c.; sheet zinc, nominally, 16.50c.; Cookson's antimony, 50c.; other grades, 35.50c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 14.75c.; copper bottoms, 14c.; copper clips, 14.50c.; red brass, 12.50c.; yellow brass, 10.75c.; lead pipe, 4.50c.; zinc, 10c.; pewter, No. 1, 21c.; tinfoil, 29c.; block tin pipe, 31c.

St. Louis

Nov. 8.—Non-ferrous metals are higher, several advances being recorded at different times in the week. Lead is now quoted at 5.25c.; spelter, 17c.; tin, 39c.; Lake Copper, 18.75c.; electrolytic copper, 18.50c.; Asiatic antimony, 38c. In the Joplin ore district the market was active and higher at $85 to $100 per ton, while the top settlement reached $103. Calamine sold at $60 to $70, with the choicest ores reaching $75. Lead ore, basis of 80 per cent metal, sold at $55 to $60. The average for the week's production was: zinc, $90.03 per ton; calamine, $61.38, and lead, $56.09. Miscellaneous scrap metals are quoted as follows: Light brass, 6.50c.; heavy yellow brass, 8.50c.; heavy red brass and light copper, 10c.; heavy copper and copper wire, 12c.; zinc, 6.50c.; lead, 3.50c.; tea lead, 3.50c.; pewter, 20c.; tinfoil, 26c.

The C. C. Fouts Tank & Silo Company, Middletown, Ohio, has moved into more commodious quarters, having purchased a large concrete factory building in that city, conveniently located on the railroad in that city, with ample grounds for additional buildings as required. Increased business compelled the change. The company specializes on quality products, building sheet metal silos, K. D. tanks, grain bins, metal shelving, ice cans and K. D. portable corrugated culvert pipe, etc. It is also prepared to take a limited amount of contract work.

Iron and Industrial Stocks

NEW YORK, Nov. 10, 1915.

The past week has been marked by severe declines in the stocks of companies whose securities have been the subject of reckless speculation, based on reports of war orders. This has naturally caused a sympathetic decline in other stocks. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

Allis-Chal., com.	30½ - 42⅞	Rumely Co., com.	4 - 6½
Allis-Chal., pref.	72 - 76¾	Rumely Co., pref.	7⅝ - 11¾
Am. Can, com.	57⅛ - 62⅛	Sloss, com.	58⅛ - 61
Am. Can, pref.	103⅝ - 106⅝	Sloss, pref.	92¾
Am. Car & Fdy., com.	77½ - 88½	Pipe, com.	27⅜ - 30⅞
Am. Car & Fdy., pref.	116¾ - 117½	Pipe, pref.	51⅜ - 55½
Am. Loco., com.	62 - 68¾	U. S. Steel, com.	83⅝ - 88
Am. Loco, pref.	98½ - 99⅜	U. S. Steel, pref.	115⅝ - 116⅜
Am. Steel Fdries.	57½ - 66	Va. I. C. & Coke.	60 - 72¾
Bald. Loco., com.	113 - 131	West. Electric	65¼ - 72¾
Bald. Loco., pref.	109	Am. Rad., com.	360
Beth. Steel, com.	420 - 465	Am. Rad., pref.	136
Beth. Steel, pref.	160½ - 167	Am. Ship, com.	36 - 42
Case (J. I.), pref.	83½ - 88⅞	Am. Ship, pref.	80 - 82½
Colorado Fuel	48¼ - 57⅝	Chic. Pneu. Tool.	79 - 85¾
Deere & Co., pref.	97	Cambria Steel	62⅜ - 67⅝
General Electric.	175 - 182	Lake Sup. Corp.	9¼ - 10¾
Gt. No. Ore Cert.	46½ - 52½	Pa. Steel, com.	50 - 70
Int. Harv. of N. J., com.	108 - 111¾	Pa. Steel, pref.	78⅞ - 85
Int. Harv. of N. J., pref.	118 - 120	Warwick	10½ - 10⅝
Int. Harv. Corp., com.	70	Cruc. Stl., com.	72¼ - 82¾
Lackawanna Stl.	73 - 80⅛	Cruc. Stl., pref.	104½ - 106½
N. Y. Air Brake.	129½ - 142	Harb-Walk. Refrac., com.	60
Nat. En. & Stm., com.	27 - 34	La Belle Iron, com.	54 - 59½
Nat. En. & Stm., pref.	92	Am. Brit. Mfg. com.	35 - 39½
Pitts. Steel, pref.	97 - 99	Can. Car & Fdy., com.	93 - 106½
Pressed St'l, com.	63½ - 72	Can. Car & Fdy., pref.	112 - 121
Pressed Stl., pref.	103⅝ - 104	Carbon Stl., com.	70 - 92
Ry. Steel Spring, com.	43¼ - 49⅜	Central Fdy., com.	16¼ - 19
Ry. Steel Spring, pref.	99 - 99⅝	Central Fdy., pref.	31 - 32
Republic, com.	47⅜ - 54	Dom. Stl., com.	49¾ - 51
Republic, pref.	104⅛ - 105⅜	Driggs-Seabury	138 - 145
		Midvale Steel	78 - 90¼

Dividends

The Niles-Bement-Pond Company, regular quarterly, 1½ per cent on the preferred stock, payable Nov. 15, and the resumption of a quarterly dividend of 1½ per cent on the common stock, payable Dec. 20. Common stock dividends were passed May 7, 1913.

The Pratt & Whitney Company, regular quarterly, 1½ per cent, payable Nov. 15.

The Studebaker Corporation, regular quarterly, 1¾ per cent on the preferred stock, payable Dec. 1, and regular quarterly 1½ per cent and extra 1 per cent on the common stock, payable Dec. 1.

The American La France Fire Engine Company, 1 per cent on the common stock, payable Nov. 15.

The American Radiator Company, regular quarterly, 1¾ per cent on the preferred stock, payable Nov. 15, and 4 per cent on the common stock, payable Dec. 31.

The American Smelting & Refining Company, regular quarterly, 1¾ per cent on the preferred stock, payable Dec. 1, and 1 per cent on the common stock, payable Dec. 15.

The International Nickel Company, regular quarterly, 5 per cent on the common stock, payable Dec. 1.

Deere & Co., regular quarterly, 1¾ per cent on the preferred stock, payable Dec. 1.

Tungsten Still Soaring

Prices of tungsten ore and tungsten metal continue to soar. A recent sale of high-grade tungsten ore is noted at $45 per unit for 60 per cent ore. In September $32 per unit was paid and in August $16. In London the quotation Oct. 22 was £2 15s. per unit, or about $13.38. Tungsten metal or ferrotungsten is now selling at about $6 per pound of contained tungsten as against 60c. to 65c. before the war, and $2.50 a few months ago. In London the quotation for ferrotungsten or tungsten metal Oct. 22 was 5s. 6d. to 5s. 10d. ($1.34 to $1.42) per unit, a decided contrast to the prices in this country.

The Automatic Products Company, manufacturer of screw machine products, has removed from Fifth and Porter Streets to 22 and 24 Dubois Street, Detroit, Mich.

PERSONAL

James A. Farrell, president United States Steel Corporation, was a visitor in Pittsburgh last week. While there he hastily inspected the Homestead and Duquesne steel works. He was in consultation with Homer D. Williams, recently elected president of the Carnegie Steel Company, and other officials and intimated that important additions to Carnegie plants in the Pittsburgh district were under consideration, but made no official statement regarding conditions in the steel trade. He expects to be in Pittsburgh again this week.

F. H. Tackaberry, who recently resigned as assistant general manager of sales of the Pennsylvania Steel Company to devote himself exclusively to personal interests, is now associated with Martin McVoy, Jr., at 1 Liberty Street, New York. He will be an active officer and director in the Industrial Underwriters, Inc., the V. & O. Press Company, Glendale, L. I., and the Locke Steel Belt Company, Bridgeport, Conn. Mr. Tackaberry was a member of the sales department of the Pennsylvania Steel Company for over nine years. In June, 1906, he was appointed sales agent for Mexico and continued in that position until conditions made it expedient to discontinue active business relations with that country. On his return to the United States he was appointed assistant general manager of sales.

John H. Gibson, representing P. P. Demidoff's Count San Donato Successors, operators of charcoal blast furnaces, open-hearth steel works and rail, structural, sheet and bar mills in the Ural district of Russia, is in the United States for the purchase of equipment for the rolling mills and a shell-making plant which the company erected some time ago. Mr. Gibson is at the Hotel McAlpin, New York.

P. W. Guthrie, Jr., has resigned as general manager of sales of the South Chester Tube Company, Chester, Pa., the change to be effective Jan. 1.

R. K. LeBlond, president, and J. A. LeBlond, vice-president, R. K. LeBlond Machine Tool Company, Cincinnati, Ohio, were very much surprised on the morning of Nov. 5 to note that their men had suddenly ceased work. Both were summoned to the main shop, where they were presented with loving cups by their employees. William Seibert, an old employee, made the presentation speech, in which he stated that the gifts were not only intended as a fitting expression of confidence in their employers but also as a rebuke to outside agitators who had lately made fruitless efforts to stir up strife in the plant.

Vaughan E. Montgomery, Cincinnati, Ohio, formerly with the Cincinnati Steel Castings Company, has joined the sales force of Crocker Brothers, pig-iron merchants, and will be connected with their Cincinnati office.

W. L. Kinsell has been appointed assistant superintendent of the shops of the New York, New Haven & Hartford Railroad at Readville, Mass.

Frank A. Burr, Boston, Mass., has been appointed instructor in power plant design at Pennsylvania State College. He is a graduate of Brown University with the degree of M.E. For four years he was at the mechanical engineering laboratories of Cornell University, where he had charge of boiler tests and Corliss engine tests and conducted classes in thermodynamics. Later he was with Stone & Webster, Boston.

Charles W. Francis, formerly assistant superintendent of the Robbins & Myers Company, Springfield, Ohio, has been appointed general superintendent of the Ahrens-Fox Fire Engine Company, Cincinnati, Ohio. The Welfare Club of the Robbins & Myers Company gave a banquet to Mr. Francis on the evening of Oct. 30, when he was presented with a gold watch by that organization.

Charles de Verdière, lieutenant of artillery, French army, is in this country on leave, in the interest of the Acieries de la Marine et d'Homecourt.

Frank L. Dalas, formerly chief electrician of the International Smelter Company, Miami, Ariz., has joined the electrical and mechanical department of the Youngstown Sheet & Tube Company, Youngstown, Ohio.

Alfred E. Ballin, manager of the gas and oil engine department of the Snow Steam Pump Works, has been made general manager of the McIntosh & Seymour Corporation, Auburn, N. Y.

W. P. Snyder, Pittsburgh, president Shenango Furnace Company, Sharpsville, Pa., has returned from a trip to California.

T. J. Gillespie, president Lockhart Iron & Steel Company, Pittsburgh, has returned from a visit to California.

J. F. King, of the accident department of the Youngstown Sheet & Tube Company, Youngstown, Ohio, has been made secretary of the relief fund, to succeed G. D. Gessaman, resigned.

Daniel T. Haddock, assistant superintendent of the Farrell plant of the American Sheet & Tin Plate Company, has been made manager of the company's tinplate plant at Morgantown, W. Va., and assumed his new duties Nov. 1.

Robert L. Willis, formerly with the Lexington Utilities Company, Lexington, Ky., has resigned to become efficiency and steam engineer of the Republic Iron & Steel Company, Youngstown, Ohio. C. C. Shackleford, chief engineer of the Republic Company, has some extensive plans for increasing the efficiency of the steam engineering department, and this work will be in charge of Mr. Willis.

D. R. Wilson, treasurer Carbon Steel Company, has been made assistant to President Charles McKnight, and will fill the duties of both positions, with headquarters in the main offices at Pittsburgh. W. W. Noble, secretary, has also been appointed assistant treasurer, and W. L. Geddis, for several years in the treasurer's department, has been made auditor in charge of the accounting and cost departments.

H. A. Christy, chairman of the board of directors of the American Ship Building Company, has resigned because of differences arising in the conduct of the company. In a published statement Mr. Christy says that the action of President Smith in throwing his lot in with certain of the directors made it impossible to complete the reforms in the company that were started two years ago.

H. V. Lewis, who has been connected with the sales department of the Allied Machinery Company of America for several months, returned from Paris last week. He will leave the company to become secretary of the Fitchburg Machine Works, Fitchburg, Mass., manufacturer of low-swing lathes. Referring to conditions in France Mr. Lewis said the French are now making shells about as fast as they are being used, and that the large shops are busy principally with large sizes of high-explosive shells.

Charles Hardy has established an office at 50 Church Street, New York, as a broker in antimony and antimony ore, tungsten metal and ore, copper ore and other minerals. Mr. Hardy was engaged in this line for 12 years in London. In the course of his business he has visited forty countries.

J. A. Post Van Der Burg, president Post Van Der Burg & Co., Rotterdam, Holland, has opened an office at 44 Whitehall Street, New York, for conducting an import and export business in machine tools and general engineering supplies.

Marcus L. Filley, Eastern sales representative of the Deforest Sheet & Tin Plate Company, has been appointed New York sales representative of the Chicago Perforating Company, and after Nov. 1 will represent both companies.

J. N. Myers, formerly of the S. B. Stine Company, of Osceola Mills, Pa., has become plant manager of the Carper Foundry & Machine Company, Mabscott, W. Va.

D. A. Barrett has been appointed district manager of the Vandergrift, Leechburg and Hyde Park sheet mills of the American Sheet & Tin Plate Company, succeeding A. H. Beall resigned, to take a long vacation.

Lawrence H. Cooney, for some years superintendent of the rail and finishing mills at the Ohio works of the Carnegie Steel Company, Youngstown, Ohio, has

resigned to become superintendent of the steel plant of the Algoma Steel Company, Sault St. Marie, Canada. His position at the Ohio works has not yet been filled.

H. I. Schotter, formerly general superintendent of the city mills of the Carnegie Steel Company, which include the Upper Union, Lower Union, McCutcheon, Painter and Monessen plants, who resigned to go to the Worth plant of the Midvale Steel & Ordnance Company, has been succeeded by Thomas Higgins, formerly assistant general superintendent. David Pryde, formerly master mechanic of the Homestead Steel Works, succeeds Mr. Higgins. Harry Stevens, who resigned as chief mechanical engineer of the Homestead Steel Works, has been succeeded by A. W. Soderberg, formerly assistant mechanical engineer. J. M. Milliken, formerly chief clerk at the Duquesne Steel Works of the Carnegie Steel Company, has resigned to go to the Midvale Steel & Ordnance Company and has been succeeded by F. D. Martin.

Paul M. Lincoln, whose term as president of the American Institute of Electrical Engineers expired July 1, 1915, and who has for a number of years been identified with the engineering department of the Westinghouse Electric & Mfg. Company, has resigned his position with this company to devote his time to the manufacture of a meter which he recently invented.

W. H. Eppeheimer, who has represented the Cambria Steel Company in Western New York, has now been given New England territory, reporting as before to L. B. Morris, district sales manager in New York.

Crucible Steel Company Report

The fifteenth annual report of the Crucible Steel Company of America, Pittsburgh, has been issued covering the operations of the company for the fiscal year ended Aug. 31, 1915. It is signed by Herbert DuPuy, chairman of the Executive Committee, and C. C. Ramsey, president. The profit and loss account is as follows:

Gross profits		$5,220,921.03
Repairs and depreciation	$1,464,616.25	
Interest on scrip, and bonds of subsidiary companies	634,112.27	
Contingencies for accidents, etc.	48,442.78	
		2,147,171.30
Net profits		$3,073,749.73

The net profits show an increase over the previous year of $1,968,710.60.

Referring to the effect of the European war on the operations of the company, which is a large importer of tungsten, and also in regard to war orders taken by the company, the report states:

One of the highest classes of steel made by the company is high speed tool steel, necessary in machine tools where rapid work is required. The basis of this material is tungsten, obtained from wolfram ore, which latter largely comes from foreign lands, much of it having heretofore entered this country through the port of Hamburg, Germany. Naturally we are now entirely cut off from this source of supply. To make matters worse, recently the British Government placed an embargo on the same material from both England and her colonies, thus preventing shipments also from these sources. The demands made upon the company by toolmakers increased and at the same time the supply of tungsten metal decreased, the resultant scarcity bringing about to-day an abnormally high-priced market for all tungsten-bearing steels. Through this great scarcity of tungsten ores, miners in all directions are seeking to discover new sources of its supply. With the increased demand, and with but such a small tonnage from which to draw, it is to-day beyond the ability of the steelmakers of this country to supply anything like the present actual requirements.

For many years this company has been actively furnishing war material to our own Government, so that this field of our line of manufacture is not a new one. In order to enlarge this department and to accept outside orders, in the spring of the present year the board of directors decided to erect an addition at its Atha plant. These buildings are now in course of erection and will make an investment of something like $3,000,000.

There have been so many false reports made in the public prints as to the value of the war orders the company has accepted that it seems wise for us at this time to state the real facts. We have taken contracts covering all descriptions of steel intended for munitions for foreign countries amounting in value to not in excess of $17,000,000, about one-half of which has been sold to domestic manufacturers. About one-half of the material called for under these contracts will be shipped by the end of 1915, the remainder following during the early months of 1916. Outside of business of this character the company has been unable to secure much export business, its output being now largely confined to domestic orders emanating through the demands of foreign countries on our home customers.

The balance sheet, as of Aug. 31, 1915, is as follows:

Assets	
Real estate, plant, good will, etc.	$46,626,167.57
Investments in advances to associated companies	9,357,180.82
Other investments	200,100.00
Inventories of raw materials and manufactured products	6,996,527.65
Taxes and insurance unexpired, etc.	62,804.04
Bills receivable	75,892.54
Accounts receivable (less reserve)	5,148,666.13
Cash	1,181,696.09
Total	$69,649,034.84
Liabilities	
Preferred stock	$25,000,000.00
Common stock	24,578,400.00
Dividend scrip due June 30, 1920, less held in treasury	1,926,428.00
Coal land purchase notes	616,000.00
Bills payable—to banks	2,315,000.00
Accounts payable, including advance payments on contracts	3,612,415.51
Interest and taxes accrued	83,754.32
Depreciation and renewal of plants (unexpended balance)	802,816.74
Fire insurance reserve	219,268.87
Contingent reserve	50,000.00
Surplus as of Aug. 31, 1915	10,444,951.40
Total	$69,649,034.84

The Crucible Steel Company of America has guaranteed the principal and interest of $7,775,000 5 per cent bonds of associated companies.

On Aug. 31, 1915, the unpaid dividends accumulated on the preferred stock aggregate 24¾ per cent.

The improvements and additions made during the year or under way at the different plants of the company are set forth in detail in the report. At the plant of the Pittsburgh Crucible Steel Company at Midland, Pa., were added two additional acid open-hearth furnaces, and this plant now contains six basic and four acid open-hearth furnaces, all of 90 tons capacity; also an auxiliary 28-in. billet mill to take care of the increased output of the open-hearth plant, relieving to some extent the pressure for rolling on the 40-in. blooming mill, which is now being adapted to roll heavier sections. Contracts have been made for a number of large steel barges, each capable of carrying about 1000 tons of coal to be supplied to the mills at Midland by the Crucible Fuel Company, an identified interest.

In regard to the Syracuse Crucible Steel Company at Syracuse, N. Y., the statement is made that the buildings have been completed, but, owing to dull times, no installations of machinery have yet been made. Recently, however, owing to the demand made upon our other Syracuse plants for the higher grades of crucible steels, it has been thought best to gradually install in it the necessary machinery to take care of this overflow business. There is no intention of making a large expenditure in this direction at one time, but gradually install from time to time such machinery as may be required.

The Eastern Iron-Ore Situation

Present indications are that all the iron ore available for Eastern furnaces from the usual sources will be required for furnace operations in the next six months, and probably more. The exact amount of the shortage in the Bethlehem Steel Company's Chilean shipments due to the closing of the Panama Canal cannot be determined. That company is increasing its shipments of Jurugua ore from Cuba as far as possible. The imports to this country from Cuba for 1915 will be cut down below early estimates because of the scarcity of vessels. Probably the year's receipts will not run over 850,000 tons from all mines. Shipments have been heavy lately from the Port Henry district, Witherbee, Sherman & Co. and the Port Henry Iron Ore Company having forwarded 82,000 tons in October.

SEPTEMBER FOREIGN TRADE

Exports of Iron, Steel and Machinery Continue on an Unprecedented Scale

WASHINGTON, D. C., Nov. 8, 1915.—High records were maintained by the exports of tonnage iron and steel and machinery in September, according to the official returns of the Bureau of Foreign and Domestic Commerce. Tonnage exports, while falling about 5 per cent short of the huge total of August, show an increase of 300 per cent over September, 1914, and exceed by 80 per cent the high figures of September, 1913. The September figures for machinery broke all records for a single month, more than doubled the total for September, 1914, beat the high figures of September, 1913, by 25 per cent and gained 8 per cent over the unprecedented total of August of this year. The nine months figures for tonnage commodities are more than double those of the corresponding period of 1914 and exceed by 15 per cent the high record made for the same months of 1913. The shipments of machinery for the first three-quarters of the current calendar year gained 27 per cent over 1914 and came within 5 per cent of the high-water mark of 1913.

The exports of iron and steel for which quantities are given aggregated in September 381,317 gross tons, as compared with 96,482 tons for the same month a year ago and 213,057 tons in September, 1913. The record of 401,298 tons in August of this year therefore stands unbeaten. The total for the nine months ended September was 2,461,198 tons, as compared with 1,142,979 tons for the same period of 1914 and 2,157,398 tons for the corresponding months of 1913. The slight decline recorded in tonnage exports in September as compared with August was due to the decrease in the shipments of steel bars and billets, and in this connection the interesting statement is made that these items would have exceeded the August figures but for the fact that large quantities of bars and billets, heretofore exported as such, are now being made up into shrapnel before shipment and find their way in the customs classification of "all other manufactures of iron and steel" or "all other explosives," according to whether they are exported in an unloaded or loaded condition. Finished shrapnel, whether loaded or unloaded, not being reported by weight, does not appear in the total of tonnage commodities, but it is believed that if this item were included in the September returns the remarkable record of August would have been materially exceeded.

Totals of the exports of tonnage iron and steel in September and for the nine months ended September, 1915, as compared with the corresponding period of 1914, are as follows:

Exports of Iron and Steel

	September—Gross Tons		Nine Months—Gross Tons	
	1914	1915	1914	1915
Pig iron	7,915	29,222	91,714	156,929
Scrap	824	10,290	29,277	40,383
Bar iron	344	6,560	3,701	26,603
Wire rods	1,913	17,909	41,595	121,981
Steel bars	6,254	37,637	79,270	298,335
Billets, ingots and blooms, n.e.s.	649	54,782	33,262	407,901
Bolts and nuts	1,109	2,514	11,819	15,401
Hoops and bands	456	3,145	6,644	19,033
Horseshoes	1,309	671	2,048	13,973
Cut nails	102	649	3,050	3,134
Railroad spikes	383	600	5,525	4,838
Wire nails	2,079	9,558	21,428	66,434
All other nails, including tacks	349	938	2,106	6,134
Pipes and fittings	.....	.....	*104,487	.....
Cast pipes and fittings	3,996	6,319	†16,819	36,789
Wrought pipes and fittings	12,273	8,615	†30,005	92,230
Radiators and cast-iron house heating boilers	259	327	2,712	1,650
Steel rails	10,508	41,060	139,773	219,494
Galvanized iron sheets and plates	3,242	6,222	30,191	64,018
All other iron sheets and plates	488	4,524	6,469	16,101
Steel plates	5,722	26,235	84,366	164,995
Steel sheets	8,248	10,069	97,464	72,857
Structural iron and steel	14,090	26,714	148,257	165,905
Tin and terne plates	4,726	22,271	44,784	105,065
Barb wire	4,950	32,827	52,592	172,974
All other wire	4,294	21,659	53,621	168,061
Total	96,482	381,317	1,142,979	2,461,198

*Figures for 6 months January to June inclusive.

†Figures cover period since June 30.

The value of September exports of iron and steel and manufactures thereof was $38,400,000, against $37,726,820 in August. The total value of such exports for the nine months ended with September, 1915, was $251,100,000, against $152,776,838 in the corresponding period of 1914. The value of September imports of the same commodities was $1,400,000, against $1,719,000 in August. The total value of these imports for the nine months ended with September, 1915, was $14,800,000, against $22,877,803 in the corresponding period of 1914.

MACHINERY EXPORTS

Significant gains appear in the table of exports of machinery for September. The total was $12,377,389, as compared with $5,295,167 for the same month of 1914 and $9,846,225 for September, 1913. The total for August of the current year, which was $11,439,291, showed a gain of but $30,000 over July, but in September the August record was beaten by nearly a million dollars. A highly suggestive element appears in the September figures. Heretofore the increase from month to month has been due chiefly to the growing shipments of metal-working machinery but in September this total fell nearly $400,000 short of that of August, while, on the other hand, no less than twenty-three of the thirty-four other items returned by the Bureau showed substantial increases. The total for the nine months ended September was $91,673,678 as compared with $72,617,657 for the same month of 1914 and $97,222,090 for the three quarters of 1913. More than one-third of the total for the nine months of the current year was credited to metal-working machinery, which gained nearly 300 per cent over the same period of 1914. Sixteen other items also showed increases, the most important being stationary gas engines, steam engines and parts, gas and water meters, milling and mining machinery, paper mill, shoe, sugar mill and textile machinery.

The following table shows the total exports of machinery for the month of September and for the nine months ended September, 1914 and 1915:

Exports of Machinery

	September		Nine Months	
	1914	1915	1914	1915
Adding machines	$18,154	$107,038	$1,103,133	$420,758
Air-compressing machinery	15,698	66,186	309,561	351,075
Brewers' machinery	11,929	1,468	174,787	55,408
Cash registers	94,981	111,379	2,897,652	976,260
Parts of	7,856	4,908	44,478	75,943
Cotton gins	5,737	8,444	99,218	48,538
Cream separators	11,189	26,341	268,562	219,290
Elevator and elevator machinery	74,859	84,839	868,915	638,359
Electric locomotives	70,675	3,293	575,088	199,270
Gas engines, stationary	7,000	22,054	244,292	357,536
Gasoline engines	226,606	586,948	4,200,900	4,105,632
Steam engines	176,092	1,551,669	2,961,641	4,054,341
All other engines	64,389	54,746	578,108	767,418
Parts of	249,229	437,939	2,192,788	3,233,649
Laundry machinery, power	14,458	29,706	307,785	245,651
All other	15,542	27,375	397,433	186,884
Lawn mowers	14,622	8,520	353,717	255,274
Metal-working machinery (including metal-working tools)	550,106	3,256,973	8,427,481	30,844,199
Meters, gas and water	28,734	7,153	97,755	187,198
Milling machinery (flour and grist)	82,451	335,493	728,484	1,826,660
Mining machinery	.....	.....	*3,928,631	.....
Oil-well machinery	152,637	70,694	†766,755	1,004,284
All other	515,055	550,437	†1,239,362	3,975,812
Paper-mill machinery	56,270	92,271	474,139	676,467
Printing presses	127,171	90,138	1,650,800	1,065,329
Pumps and pumping machinery	191,747	392,138	2,372,170	2,298,447
Refrigerating and ice making machinery	32,541	25,302	484,352	630,998
Sewing machines	427,782	393,635	7,134,817	4,469,386
Shoe machinery	93,932	139,693	872,890	1,142,801
Sugar-mill machinery	347,158	606,008	1,156,408	2,379,134
Textile machinery	69,168	183,120	931,475	1,386,619
Typesetting machines	56,114	44,313	1,428,562	338,556
Typewriting machines	221,815	506,180	6,747,183	5,121,475
Windmills	55,934	90,514	939,354	654,525
Woodworking machinery, saw mill	35,642	20,579	436,905	265,841
All other	58,899	146,579	756,651	690,953
All other machinery, and parts of	1,113,545	2,194,616	14,456,425	16,523,962
Total	$5,295,167	12,377,389	72,617,657	91,673,678

*Figures for six months, January to June inclusive.

†Figures cover period since June 30.

It will be noted that a part of the mining machinery exported in the first three quarters of 1914 was separately reported as "oil well machinery" and "all other" while the greater part was not separately classified.

IMPORTS OF IRON AND STEEL

The imports of iron and steel for which quantities are given amounted to 31,814 gross tons in September, 1915, as compared with 38,420 tons for the same period

of 1914 and 19,941 tons for September, 1913. The total for the nine months of 1915 was 392,518 tons as against 234,230 tons for the same period of 1914 and 244,602 tons for the first three quarters of 1913.

The following table shows the imports of tonnage commodities for the month of September and for the nine months ended September, 1914 and 1915:

Imports of Iron and Steel

	September—Gross Tons		Nine Months—Gross Tons	
	1914	1915	1914	1915
Ferrosilicon	355	9,395	4,941	220,848
All other pig iron	23,975	5,273	107,130	57,117
Scrap	2,142	9,229	24,493	29,918
Bar iron	609	813	14,042	6,595
Structural iron and steel	396	49	8,484	1,202
Steel billets without alloys	46	2	1,740	1,118
All other steel billets	3,078	769	31,017	8,061
Steel rails	7,342	6,273	18,682	60,546
Sheets and plates	235	66	3,355	923
Tin and terne plates	92	31	14,704	2,220
Wire rods	150	614	5,642	3,870
Total	38,420	31,814	234,230	392,518

Beginning with Jan. 1, 1916, the Bureau of Foreign and Domestic Commerce will undertake to report imports of ferromanganese separately. This is to meet the wishes of importers and consumers of this alloy.

W. L. C.

Six New Worth Open-Hearth Furnaces

The Midvale Steel & Ordnance Company, the new owner of the Worth Brothers Company, Coatesville, Pa., has broken ground for the erection of six new open-hearth furnaces adjacent to the present steel plant. The work on these furnaces is to be pushed to early completion. The company has also announced that it is soon to begin building a new blooming mill which will be located between the steel plant and the plate mills. This will increase the output of the plate mills considerably. There will also be installed two 750-kw. turbo-generators. The company recently purchased 205 acres from the Craig Ridgway & Sons Company, making its total land holdings approximately 905 acres. The plate mills at Coatesville are being operated up to capacity. A new record for output was made in October.

For the Midvale plant at Nicetown, Philadelphia, purchases of new equipment are being made, chiefly hydraulic and electrical machinery.

Harry P. Stevens, chief mechanical engineer of the Homestead Steel Works, in which position he was successor to P. T. Berg, recently resigned to become chief engineer of the Midvale Steel Company and Worth Brothers Company. H. I. Schotter, who had been for a number of years general superintendent of the city mills of the Carnegie Steel Company—the Upper Union, Lower Union and the various hoop mills—has accepted the appointment as general superintendent of the Worth plants at Coatesville.

The Hess Steel Corporation, which is headed by Henry Hess of Philadelphia, and which will build a plant in or near Baltimore for the purpose of electrically manufacturing high grade steel products, has filed papers of incorporation. It will have $1,500,000 capital stock, $500,000 of which is preferred. The directors are Henry Hess, Henry Lawrence Hess, Edmund von Maltitz, P. M. Sharpless and Peter Vogel, all of Pennsylvania; Frederick W. Wood, president Maryland Steel Company; Charles M. Cohn, vice-president Consolidated Gas, Electric Light & Power Company, Baltimore, and J. Kemp Bartlett, Baltimore. A meeting of the directors will be held this week and Henry Hess will be made president.

The Standard Screw Products Company, Detroit, Mich., has just purchased two properties adjoining its present site at Bellevue and Warren avenues and the Detroit Belt Railway. Contracts will be let this month for extensions to the company's buildings, and the newly acquired property will be reserved for a modern plant to be built in the coming year. The immediate extensions are only sufficient to take care of output now under contract.

Alton Steel Hoop Plant Improved

The Alton Steel Hoop Company, successor to the Alton Steel Company, Alton, Ill., is making changes and improvements in its plant wherever the previous operation of the mill developed shortcomings. These improvements are principally concerned with a change of the heating system for the blooming mill. The old arrangement consisted of two flat furnaces with a horizontal charging machine. The company is now installing two four-hole soaking pits, with Alliance Machine Company stripping crane and charging crane. The pits and cranes will be housed in a building 65 x 175 ft. At the delivery end of the mill, it is taking out the present 6 x 9 in. shear and installing a Mackintosh, Hemphill & Co. hot saw of a size to cut up to 12 x 12 in. hot billets. In the boiler house it is installing 1000 h. p. additional boilers, together with hydraulic pumps, air compressors and boiler feed pumps.

Changes to the 18-in. mill include the relocation of the mill, redesigning of the drive and the installation of tables after the second and fourth passes. A hot saw designed to cut up to 6 in. round is being installed in place of the present billet shear. At the open-hearth furnace a number of minor changes are being made, chief among which is the abandonment of the 2000-lb. ingot used by the old concern and the substitution of equipment for a 5000-lb. ingot.

At the hoop mills the run-out tables will be entirely remodeled and some slight changes made at the coilers and shears. The water pumping plant will be changed, and the improvements to this department will include the installation of a 50,000-gal. Pittsburgh-Des Moines Steel Company tank.

The plant will be taken over and operated by the Alton Steel Hoop Company, and it is the belief of the new owners that when these improvements are completed they will have a very efficient operating unit and satisfying source of supply for their customers. They expect to begin to roll steel on Jan. 1, 1916.

Steel Corporation Extensions

Announcement was made in THE IRON AGE, Sept. 30, of the large appropriation made by the finance committee of the United States Steel Corporation for extensive additions to the South Chicago works of the Illinois Steel Company. In a statement issued last week Chairman Gary said that the new installations will include two 100-ton tilting open-hearth furnaces. This duplexing plant and the auxiliary equipment are expected to cost about $2,000,000. At the same time Judge Gary referred to the authorization just given for the construction of a wire rod mill at the Cuyahoga works of the American Steel & Wire Company, Cleveland. It is expected to push the work so that the mill will be in operation in the second half of 1916.

The improvements at the South Works of the Illinois Steel Company, referred to above, include the installation of three twin tandem gas-driven blowing engines, each having a capacity of 45,000 cu. ft. of free air per minute. The two tilting open-hearth furnaces will be used in conjunction with the present Bessemer converter plant. This duplexing capacity will add approximately 40,000 tons monthly to the open-hearth-steel output of South Works. The installation of the duplexing process will involve some necessary improvements at the Bessemer plant.

The following publication was made by the American Steel Foundries following the meeting of the directors in New York last week: "The American Steel Foundries has closed munitions contracts aggregating a little less than $18,000,000. The machining will be done by the Westinghouse Electric & Mfg. Company and the Pollak Steel Company will furnish part of the forgings. The regular business of the company is improving. All plants are running, and it is expected that they will be up to full capacity next month." The report for nine months ended Sept. 30 showed a deficit after all charges and depreciation of $430,128. In the September quarter the deficit was $123,000.

Pittsburgh and Nearby Districts

Press reports regarding the orders for war munitions taken by the LaBelle Iron Works, Steubenville, Ohio, have been much exaggerated. The company has recently taken contracts for a moderate amount of high carbon steel bars to be furnished to the Allies, and states that the amount involved is only a fractional part of that reported in the daily press, and that it proposes to take care of its domestic trade, the demand from which at present is taking the greater part of its output. All departments of its plant are running full, except the pipe and sheet mills.

The Federal Radiator Company, New Castle, Pa., expects to start its plant, formerly owned by the Penn Motor Car Company, in partial operation the latter part of this month. It has been making such additions to equipment as were necessary to manufacture cast-iron radiators and house-heating boilers.

The Pittsburgh-Des Moines Steel Company, Curry Building, Pittsburgh, which is making some additions to its plant, has purchased one 24-in. and one 48-in. open-gap punch of the plain jaw type, equipped with special multiple attachments for punching plates, from the Cleveland Punch & Shear Company, Cleveland, Ohio.

The Franklin Foundry Company, Franklin, Pa., has been organized with a capital of $25,000, and will build a plant for the manufacture of steel castings.

The American Vacuum Can Company has plans to build a plant near Charleston, W. Va., for the manufacture of vacuum milk cans and other sheet metal articles. It is said the company will install machinery to make 100,000 cans per day, and will erect a building 150 x 200 ft.

No. 8 open-hearth furnace in the plant of the Brier Hill Steel Company, Youngstown, Ohio, has been started, increasing the capacity about 15 per cent. This plant is now equipped with eight 85 to 90-ton furnaces, and two more are being added.

After being idle more than a year the works of the American Steel Foundries at Sharon, Pa., has been ordered to resume work. It employs about 600 men when running full. W. C. Fletcher is general superintendent.

The monthly meeting of the Association of Iron and Steel Electrical Engineers will be held in the Seventh Avenue Hotel, Pittsburgh, on the evening of Nov. 13. The subject for the evening will be "Electric Current Collectors for Locomotives, Cars, Ore Bridges, Cranes, etc., including Third Rail Systems, Main and Trolley, Collectors on Cranes, etc."

The Independent Bridge Company, Pittsburgh, has secured a site of 11 acres on Neville Island, which has rail and river shipping facilities, and it expects to commence in a short time the erection of a new plant, which will have about three times the capacity of its present plant, located on Beaver Avenue, North Side, Pittsburgh. The company will be in the market for cranes and other equipment.

The Driggs-Seabury Ordnance Company, Sharon, Pa., has taken an order for about 116,000 6-in. shells for a foreign government. The amount of the contract is said to be about $2,000,000. With other large orders for war munitions, this is expected to keep the plant in full operation for some months.

On Sunday, Nov. 7, union molders employed in the brass, iron and steel foundries in Pittsburgh, held a meeting and decided by a vote of 420 to 18 to make a demand for an 8-hr. day at the same rate of wage which is now paid for 9 hr. In the event of the refusal of the employers to grant the demand, it will be referred by the men to the International Executive Board for approval. If this board sanctions the demand a strike will be called. It is said that over 1300 men are affected.

The Thomas Carlin's Sons Company, Pittsburgh, reports among recent orders the following: Bryden Horse Shoe Company, two No. 38 belt-driven shears; Jones & Laughlin Steel Company, two 8-ft. self-discharging grinding pans; Western Iron & Pipe Company, Tulsa, Okla., one No. 5 shear; U. S. Engineer Office, two 10 x 10 link motion engines for operating gates on a Ohio River lock, and valve gate operating machine for a Monongahela River lock.

The Aluminum Company of America, Pittsburgh, is negotiating for the purchase of the entire plant of the Southern Aluminum Company, near Whitney, N. C. Nothing definite has yet been done, but it is expected that the purchase will shortly be effected.

The waterworks and sewage board, Clarksburg, W. Va., will receive bids until Nov. 26 for the installation of two gas engines and two pumps at the municipal pumping station. G. W. Fuller, 170 Broadway, New York, consulting engineer, has plans and specifications.

The Republic Iron & Steel Company, Youngstown, Ohio, expects to have its two new 90-ton open-hearth furnaces completed on or about Jan. 1. The new lap and butt weld pipe furnaces being erected by the company will not be completed until later. The 75 Koppers by-product ovens are now in full operation, and the company is making enough coke to supply its five blast furnaces in the Youngstown district.

Kittanning furnace, at Kittanning, Pa., recently leased by the Jones & Laughlin Steel Company, started Nov. 9 to make ferromanganese. It is expected to turn out from 150 to 175 tons per day.

The Pittsburgh Steel Company, Frick Building, Pittsburgh, is adding three 90-ton furnaces to its open-hearth steel plant at Monessen, Pa.

The Standard Steel Car Company of Pittsburgh is adding three 75-ton furnaces to its open-hearth steel plant at Butler, Pa.

The contract for a two-high reversing mill capable of rolling plates up to 6 in. thick and 15 ft. wide for deck protection on battleships for the Imperial Steel Works, Osaka, Japan, was taken by the Morgan Engineering Company, Alliance, Ohio, instead of the Morgan Construction Company, Worcester, Mass., as stated in THE IRON AGE of last week.

Among contracts recently taken by the Asbestos Protected Metal Company, Pittsburgh, are asbestos protected metal corrugated sheets for the new spelter plant of the American Steel & Wire Company, Donora, Pa., roofing and siding material for new municipal pier 35 at San Francisco, and several buildings for the Bethlehem Steel Company, South Bethlehem, Pa. Among new large jobs taken for asbestos steel concrete construction are buildings for the Bonnot Company, Canton, Ohio, and new factory building for the Curtis Bay Distilling Company, Baltimore.

New Installations of Heroult Electric Furnaces

The United States Steel Corporation has granted licenses for the installation of six Heroult electric steel furnaces as follows:

The Albania Power Company, Anniston, Ala., a 6-ton furnace.

The Crucible Steel Casting Company, Cleveland, Ohio, a 1-ton furnace.

The Monarch Steel Casting Company, Stockton, Cal., a 1-ton furnace.

The Universal Rolling Mill Company, Bridgeville, Pa., a 6-ton furnace.

The Carbon Steel Company, Pittsburgh, Pa., a 6-ton furnace.

The Braeburn Steel Company, Braeburn, Pa., a 6-ton furnace.

With these new contracts the total number of Heroult furnaces operating or contracted for in the United States and Canada is 36.

The Inland Steel Casting Company, Terre Haute, Ind., is now manufacturing annealed steel and malleable castings on its own account. The company would like to receive catalogs of equipment and supplies required in its operations.

Sarah furnace of the Kelly Nail & Iron Company, Ironton, Ohio, was blown out Nov. 3 for relining.

British Embargo on Steel Exports

Referring to the possible prohibition of exports of steel by the British Government, intimated in a cablegram from London in THE IRON AGE of Oct. 21, the following from the London *Ironmonger* of Oct. 23 is interesting:

So far no confirmation has been forthcoming of the rumor that the exportation of steel from the United Kingdom may be temporarily suspended. It is believed that the authorities have the question under consideration, but that their decision will depend upon the ability of the works, under the present conditions, to meet the ever-increasing demands for government material. The complete prohibition of steel exports would be so serious a step that it will certainly not be enforced unless it is deemed imperative. It is recognized that the equilibrium of foreign exchange is largely dependent upon the maintenance of our general export trade and the stoppage of steel shipments could hardly fail to exercise a detrimental influence in this respect. Moreover, foreign and colonial consumers would be driven more than ever into the American market for supplies, and it might be difficult afterwards for home producers to restore some of these connections, especially as our exports have already been restricted severely by the difficulty of securing licenses for export. Another point is the question of prices. Every additional order booked by the United States manufacturers tends to send prices further against the British purchaser, but these considerations like everything else, must bend to military necessity. That will be the deciding factor in the situation.

Lake Ore Shipments in October

The iron-ore shipments down the Lakes from the Lake Superior region in October were 7,146,873 gross tons, compared with 4,242,392 tons in October, 1914. This is an increase of 2,904,481 tons or 68.46 per cent. In September the shipments were 7,863,146 tons. The following table gives the October and season shipments by ports and the corresponding figures for 1914 in gross tons:

	October, 1915	October, 1914	To Nov. 1, 1915	To Nov. 1, 1914
Escanaba	928,399	421,341	4,940,081	3,440,992
Marquette	522,671	265,861	2,836,203	1,651,579
Ashland	866,170	487,829	4,695,752	3,229,746
Superior	1,351,893	1,442,216	7,348,916	10,920,469
Duluth	2,301,352	918,144	14,108,571	6,197,043
Two Harbors	1,176,388	707,001	7,886,916	5,511,976
Total	7,146,873	4,242,392	41,816,439	30,951,805
1915 increase	2,904,481	(68.46%)	10,864,634	(35.10%)

The Duluth percentage to Nov. 1, 1915, was 33.74 against 20.02 per cent last year, while the Great Northern dock at Superior shipped only 15.14 per cent of the total this year against 32.9 per cent to Nov. 1, 1914. The increase to Nov. 1, this year, of 10,864,634 tons, or 35.10 per cent, contrasts with a decrease of 14,847,715 tons to Nov. 1, 1914, or 32.42 per cent. The season shipments this year may run close to 47,000,000 tons.

A New French Purchasing Commission

Maurice Damour, formerly French consul general at New Orleans, La., reached New York Monday, accompanied by four other members of the French Industrial and Commercial Commission. They state that their object is to arrange to purchase large quantities of structural iron and steel, machinery and industrial supplies for reconstructing and modernizing French industries when the war is over. Mr. Damour is now secretary of appropriations of the French Chamber of Deputies. Much labor-saving machinery is mentioned as necessary to assist in making up for the loss of men in the war. While not a government organization, this commission is said to be backed by the large French industrial and commercial organizations as well as by important bankers. They plan to remain in this country several months, with New York as headquarters, making trips to industrial centers.

Before the American Society of Marine Draftsmen at Bridgeport, Conn., Nov. 12, a series of three industrial motion picture films will be shown, illustrating the manufacture of the product of the National Tube Company from the ore to the final finishing operations. The taking of the pictures involved eight months' work.

OBITUARY

COL. T. E. VICKERS, of Vickers, Ltd., formerly Vickers Sons & Maxim, died in London, England, Oct. 19, aged 82 years. He introduced into Great Britain a method of manufacturing steel castings, bells and rings for rolling-stock tires. A double rolling mill for rolling railroad tires from punched blooms was one of his inventions. He received the Howard quinquennial prize given by the Institution of Civil Engineers "in recognition of the part taken during his career in developing and improving the production of steel for important engineering purposes." He made a success of the open-hearth process in the 70's when there was little knowledge and when instruments for accurate measurement of temperature were lacking.

CHARLES H. CONOVER, president of Hibbard, Spencer, Bartlett & Co., hardware jobbers, Chicago, died suddenly Nov. 4, at a time when his recovery from an attack of penumonia was confidently expected. He was 68 years old and had been associated with his company for 44 years. He was born at Easton, Pa., and removed with his parents to Buffalo when 12 years old. After receiving his education in the public schools he entered the employ of Pratt & Co., hardware merchants. In 1871 Mr. Conover removed to Chicago and became a buyer for the house of which he was destined to rise to the head. He grew to occupy a prominent place in the business affairs of Chicago.

HENRY BENJAMIN SMITH, supervisor of safety and labor, Joliet works, Illinois Steel Company, died Nov. 7 at Joliet, Ill., aged 53 years. He was born in San Francisco and entered the employ of the old Joliet Steel Company in 1878. His uncle, Horace S. Smith, was at that time general superintendent of the company. Mr. Smith served in the Spanish-American war as captain of a volunteer regiment from Joliet. He was one of the first to take up safety work in the plants of the Illinois Steel Company, having been appointed safety inspector at the Joliet works in 1893, and his achievements in this cause have been most notable. He leaves his widow and one son.

ISAAC L. RICE died Nov. 2 at the Hotel Ansonia, New York City, aged 65 years. He was president of the Car Lighting & Power Company and held large interests in a dozen or more other corporations. He was graduated from Columbia University in 1880, studied law and for several years was a lecturer in the Columbia Law School and instructor in political science. In 1886 he became a promoter and as a railroad lawyer he took a leading part in reorganizations and litigations. He was a pioneer in founding the storage battery industry in this country and became president of the Electric Vehicle Company. He leaves his widow and six children.

OTIS WINSLOW EVERETT, vice-president Samuel Winslow Skate Mfg. Company, Worcester, Mass., was killed Nov. 4 in an automobile accident in which his son Lewis was also injured. Mr. Everett was born in Newton, Mass., March 22, 1852. He entered the employ of his uncle, Samuel Winslow, in June, 1876, and had been connected continuously with the company since as an employee and official.

EDWARD L. GAYLORD, former president Eagle Lock Company, Terryville, Conn., died Nov. 2 in Bridgeport, Conn., where he had made his home for many years. Starting in life as a clock maker, he soon became connected with the lock industry and during his long activity in that business took out over eighty patents for locks and lock and key making machinery.

WILLIAM H. WHITE, Jr., who for the last 30 years had been connected with the Otis Elevator Company, died Nov. 2 at his home in New York City, aged 54 years. He was a member of the board of governors and assistant treasurer of the Engineers' Club, was also a member of the Railroad Club.

NEW ENGLAND LABOR TROUBLES

Machine Shop Situation at Hartford, Worcester and Other Cities

Although the situation at the plant of the Pratt & Whitney Company, Hartford, Conn., continues to improve and the officials remain firm in their determination to grant none of the strikers' demands, the labor agitators are very active among the employees of the other manufacturing concerns of the city. As a result of their efforts there are strikes in the plants of the Hart & Hegeman Mfg. Company, the Arrow Electric Company, the Billings & Spencer Company, the Taylor & Fenn Company, the Colt's Patent Fire Arms Mfg. Company, the Underwood Typewriter Company, the Jewell Belting Company and the Rhodes Mfg. Company, according to reports in the local press. Officials of the concerns affected assert that only a small part of their employees have gone out and none have been compelled to close down. Only a few polishers are out at Colt's and the polishers are the only ones out at the Underwood plant. The labor leaders have announced that there will be no general strike at the Underwood Company at present, as the shop is not well enough organized. At the plant of the Billings & Spencer Company, the drop forgers signed the following paper and appointed a committee to present it to F. C. Billings, vice-president of the company:

> We, the undersigned, had nothing to do with appointing a committee to wait on Mr. Billings regarding eight hours. We are perfectly satisfied with conditions as they are and appreciate the efforts of the company to keep them up to their present standing.

That the Hartford manufacturers intend to take the same firm stand as was taken in Providence and Worcester is shown by the statement issued Nov. 2 by Charles L. Taylor, president of the Manufacturers' Association of Hartford County and head of the Taylor & Fenn Company. After referring to the conditions existing before the strike, as exemplified in particular at the Pratt & Whitney Company's plant, where productive capacity has been doubled many times in the past year and wages advanced until the company "is actually paying the highest wages of any machine tool building concern in this country," the statement says:

> Yet, utterly disregarding this spirit of progressiveness and fair dealing, the Pratt & Whitney Company was assailed by the agitator, and some of its men induced to walk the streets. In the summer and fall of 1914 this same plant was running four days a week because of the business depression.
>
> Hartford is having a demonstration of the conditions caused by misrepresentation and false promises. Able-bodied, skillful mechanics are seen walking the streets with tag boxes begging for money, while the positions they left at which they earned more money than ever before await them. Families are suffering; the landlord and grocer are embarrassed, not because there is no work, but because the breadwinner has been misled by the agitator.
>
> I have had every opportunity of discussing the existing industrial situation with a great many of the manufacturers of Hartford, and it is my opinion that not a single demand will be granted and no reduction in the running time can be seriously considered during these abnormal times.

The 3000 striking silverworkers of the Meriden and Wallingford, Conn., plants of the International Silver Company, rejected at a meeting, Nov. 2, the compromise offer of the company which was substantially a nine-hour day with ten hours' pay. The strike has since extended to the Rogers & Bro. Company branch at Waterbury.

Labor conditions at New Haven, Conn., are but little changed. It is reported that some of the former employees are returning to work at the New Haven Clock Company and that over 400 hands are now back at work. The company employs about 2000 hands.

WORCESTER MANUFACTURERS CITE STRIKE FAILURES IN THE CENTRAL WEST

Some of the manufacturers in Worcester, Mass., state that they are securing some help from outside the city and that some of their old employees are returning to work. As a whole, however, there has been lit change in the situation. Some days ago the labor le ers announced that they were prepared to furnish a li of 1187 men who had secured jobs elsewhere and h left the city. As the place most frequently mentio is Bridgeport, the secretary of the Worcester branc National Metal Trades Association, in a statement pu lished in a local paper, Nov. 7, included facsimiles letters purporting to show the real conditions in Bridg port. One such letter to a Worcester striker from t business agent of the union said: "In reply to you of the 22d would say that Bridgeport is very mu overcrowded, and I would advise you to stay away unt things get straightened out. There has been such rush from Worcester that men are walking the stree in search of work."

Two paragraphs of special interest in the Met Trades Association statement, because they set for the employers' viewpoint clearly, are these:

> Whatever Worcester merchants and bankers or the Sta Board of Conciliation and Arbitration may think about t attitude of Worcester employers toward the machinists Worcester or toward organized labor, it is quite certain t employers, and particularly the members of the Worceste Branch, National Metal Trades Association, have studi carefully the problems of competition with which Mass chusetts manufacturers have to contend, and they have not the phenomenal development of such open shop cities Hartford, Boston, Providence, Detroit, Indianapolis and ma others which could be mentioned.
>
> It is one thing to have public service corporations here New England controlled by organized labor if the gener public wants to pay the price, but it is quite a different thi to have the labor union restrictions placed on individu manufacturers competing with such cities as Cincinnat Cleveland, Hartford and Providence, where the efforts union organizers have failed within a few days to chan the hours of labor or the rates of wages.

It is reported that the 350 striking employees of th Springfield Metal Body Company, Springfield, Mass will return to work, a satisfactory compromise havin been reached. It is understood that the basis of settl ment is a 50-hr. week immediately and a 48-hr. wee when certain contracts are completed. There is to b no reduction in wages and time and a half is to be pai for overtime and double time for Sundays and hol days.

The strike at the Union Twist Drill Company, Athol Mass., appears to be over, although it has not bee formally called off.

New Electric Steel Plant to Use the Rennerfel Furnace

An electric steel plant is being erected on Bell Isle, Richmond, Va., by the Old Dominion Iron & Nail Works Company of that city. It is to contain tw 4-ton electric steel furnaces capable of turning ou 40 tons of ingots per day which will be rolled int commercial bars in the company's mills. A further in stallation of three times the amount as a maximum i contemplated if the local and contiguous market ca absorb the product. The principal raw material wil be miscellaneous steel scrap. The finished materia will be commercial steel bars and billets for the manu facture of forging billets. Operation of the new plan is planned for early in 1916.

The Rennerfelt electric steel furnace, described i THE IRON AGE, Jan. 15, 1914, will be used, and thi will be its first installation in the United States. Th company also announces that a Baily electric furnac will be installed for heating billets and for use as soaking pit for ingots.

The Alan Wood Iron & Steel Company, Philadelphia is doing preliminary work at Conshohocken, Pa., for the addition of two open-hearth furnaces to its plant The lay-out provides for three new furnaces ultimately

---

The Monterey Iron & Steel Company, Monterey Mexico, will make extensive improvements to its iron and steel plant.

UYING MACHINE-TOOL PLANTS

otions Obtained on National-Acme and Wind- or Machine Company's Plants by Shell Maker

The R. B. Phillips Mfg. Company, Boston, of which B. Phillips is the head, has obtained options on the nts of the National-Acme Mfg. Company, Cleve- d, Ohio, and the Windsor Machine Company, Spring- d, Vt., two of the largest manufacturers of multiple- ndle automatic screw machines, for which there has en an enormous demand incidental to the manufac- re of shrapnel fuses and parts for shells. Both nts are filled with orders for months ahead. That deals will be closed is regarded as a foregone con- sion by the trade because of information it has at nd, and its view is substantiated by the fact that ps are already under way for the formation of a w corporation to take over the two companies.

Mr. Phillips, who is treasurer and general manager the American Steam Gauge & Valve Company, Bos- n, some months ago obtained a large English con- ct for shrapnel shells and fuses, and subsequently tained other orders of large size. Immediately after taining the first contract Mr. Phillips's company rchased the Critchley Machine Screw Company and e Reed & Curtis Machine Screw Company, both at orcester, Mass., and the Paterson Rubber Company, well, Mass. The Critchley plant at the time of its rchase was working on a fuse contract, and plans re at once begun for its extension. At that time it s reported that the R. B. Phillips Mfg. Company d ordered automatic screw machinery to the value $300,000 in Cleveland. Altogether hundreds of ma- ine tools were purchased by the company. In October e Phillips interests purchased from the Equitable ust Company, New York, a paper plant at Ports- uth, N. H., which originally cost $2,000,000, and at t time it was reported that Mr. Phillips had obtained French contract for shells valued at $20,000,000 rough J. P. Morgan & Co.

The R. B. Phillips Mfg. Company is associated, in manufacture of war munitions, with the East Jer- Pipe Corporation, Paterson, N. J., which is making gh-explosive shells. It is understood that the com- ed interests have contracts for 3, 6, 9 and 11 in. lls. The T. A. Gillespie Company, a large construc- n company, is interested in the East Jersey Pipe rporation, the regular line of which is making lock r steel pipe, but which has purchased large numbers machine tools to handle its shell work.

The National-Acme Mfg. Company has an authorized pitalization of $2,500,000, practically all of which has en issued, and since its organization in 1901 has been exceedingly profitable enterprise. In addition to nufacturing machines it has a large products de- rtment and carries its products in stock at its branch ce, 77 White Street, New York. The Windsor Ma- ine Company is controlled by the Potter & Johnston achine Company, Pawtucket, R. I., which makes auto- tic machine tools.

The R. B. Phillips Mfg. Company in the past few ys has been endeavoring to buy ninety automatic ew machines. It is understood that when it takes r the National-Acme and Windsor plants, present ntracts will be filled, after which the output will be d to the Allies through J. P. Morgan & Co. until their quirements are satisfied.

Electric Steel for Saws and Knives

Though a producer on a large scale of high-grade ucible steel for saws, knives, etc., the Simonds Mfg. mpany has contracted with the United States Steel rporation for license and with the American Bridge mpany for the installing of a 5 to 6 gross ton eroult three-phase electric melting furnace at its el plant in Lockport, N. Y. This company procured e first Girod license in the United States and a 500- furnace was installed at the steel mill, then in Chi- go, for experimental purposes. When the steel mill s moved to Lockport in 1910 this furnace was moved as part of the regular equipment. In 1914 it was dismantled and a larger furnace designed and built by the company's engineers, following very closely the original Siemens type with one electrode in the hearth and one through the roof. Results obtained from these two furnaces have indicated that a larger furnace of the type now building would be desirable. The furnace and auxiliaries are of designs based on the experience of the Société Electro-Métallurgique Française and the United States Steel Corporation. Construction of buildings, auxiliary equipment and the furnace itself is well under way, and it is hoped to have the furnace under power by Jan. 1, 1916.

Extras Charged on Large Rivets

Our readers will be interested at this time in the details of the "Large Rivet List" covering base sizes and extras, adopted by the manufacturers and made effective Oct. 15, 1912. The list is as follows:

Base Sizes

Structural rivets, standard head. In kegs or bags weighing 250 lb.	¾ to 1¼-in. dia., incl. 2 to 5 in. long
Boiler rivets, standard heads. In kegs or bags weighing 200 lb.	¾ to 1¼-in. dia., incl. 2 to 5 in. long
Ship rivets, standard heads, straight necks. In kegs or bags weighing 250 lb.	¾ to 1¼-in. dia., incl. 2 to 5 in. long

Standard Extras

	Per 100 Lb.
1. ½ and 9/16-in. diameters	$0.50
2. ⅝ and 11/16-in. diameters	.15
3. Rivets larger than 1¼-in. diameter	.25
4. Lengths 1 in. and shorter	.50
5. Lengths between 1 and 2 in.	.25
6. Lengths over 5 in.	.25
7. Flat head rivets	.25
8. All standard countersunk head rivets	.25
9. Swell neck rivets	.25
10. Special heads other than our regular standards, minimum charge	.25
11. Small orders for miscellaneous sizes for less than 2 tons to parties not under contract	.10
12. Rivets packed in 100-lb. packages	.10

13. No shipments made of less than 100 lb. If customer must have small odd quantities less than 100 lb., for each keg broken to fill such quantities a flat charge of 50c.
14. All cone and countersunk head rivets to be charged at boiler rivet price.
15. Cost of testing and inspection, if any, to be at customer's expense.
16. High carbon or special alloy rivets, special extra price upon application.

German Steel Shipments Still Declining

September shipments of the German Steel Works Union were 246,840 metric tons against 250,080 tons in August. This is the lowest record since November, 1914, the deliveries showing a constantly decreasing tendency since February, 1915. These contrast with an average monthly delivery of 528,204 tons in 1913. The September shipments were made up of 67,220 tons of semi-finished steel, 117,426 of railroad material and 62,194 tons of shapes.

The Luther Grinder Mfg. Company, 285 South Water Street, Milwaukee, Wis., made ten large export shipments of tool and other grinders last week. They went to fill orders from South America, South Africa and India. The company is experiencing the greatest rush in its history, stating that none of its business is on war account.

The Wright Wrench & Forging Company, Canton, Ohio, has just completed a large addition to its forging plant, greatly increasing both the drop forge department and the department for making all kinds of drawn machinery forgings. This largely increased capacity enables the company to take care of orders promptly.

The Electric Controller & Mfg. Company, Cleveland, Ohio, has closed a deal to take over the adjoining plant of the Van Dorn & Dutton Company. The latter company has under way the erection of a large new plant on another site and will continue to occupy its present quarters until the new plant is completed.

Virginia Iron, Coal & Coke Report

The Virginia Iron, Coal & Coke Company, Roanoke, Va., has issued its thirteenth annual report, which covers operations for the year ended June 30, 1915. It shows gross earnings of $2,844,165.34 and a loss for the year of $244,722.40, against gross earnings of $4,262,508 and a loss of $117,606 in the previous year. The general balance sheet as of June 30, 1915, is as follows:

Assets	
Real estate and plant	$12,307,841.35
Equipment	492,787.98
Securities owned	197,363.20
Sales ledger balances	212,453.40
Sundry bills ledger balances	29,925.96
Accounts receivable	70,290.83
Bills receivable	42,004.86
Advances to cashiers and superintendents	4,196.40
Cash balance at commissaries	368.03
Cash on hand	90,368.82
Stock of finished material:	
Pig iron	1,539,811.04
Other products	167,732.34
Raw material	330,782.42
Supplies	254,260.04
Merchandise	121,362.51
Farm products	38,716.83
Sinking fund	353.34
Profit and loss	1,663,595.72
Total	$17,564,215.07
Liabilities	
Capital stock	$10,000,000.00
First mortgage gold bonds	4,780,000.00
Carter Coal & Iron Co. bonds	369,000.00
Unpaid vouchers	198,205.99
Unpaid payrolls	37,768.96
Bills payable	1,995,994.26
Accounts payable	71,508.69
Bond interest accrued—Carter bonds	4,612.50
Bond interest accrued—V. I. C. & C. Co. bonds	79,600.00
Fund for furnace repairs	27,524.67
Total	$17,564,215.07

During the year the company expended $183,717.85 for improvements to owned properties and $11,751.98 for improvements to leased properties. Operating and other accounts were charged during the year with $103,105.85 as a fund for depreciation of coal lands, $2,798.50 fund for depreciation of ore lands, $182,931.57 fund for depreciation of improvements to owned properties, $51,625.49 fund for depreciation of improvements to leased properties and $16,355.50 fund for furnace repairs, making a total for these purposes of $356,816.91.

The company retired by purchase seven Virginia Iron, Coal & Coke Company first mortgage bonds costing $5,800, fifteen Carter Coal & Iron Company bonds costing $14,835 and purchased real estate to the amount of $58,625.

The company made a profit during the year of $405,242.32 in the operation of its coal mines, $6,336.67 in the operation of its coke ovens and $11,921.02 in the operation of its grist mills, and lost $10,239.30 in the operation of furnaces and $6,686.67 in the operation of foundries and shops.

From the accompanying statement by President John B. Newton, the following remarks are taken: "The year ended June 30, 1915, was an unprofitable one for the manufacturer of pig iron in this country, and your company was not an exception to the rule. There was very little demand throughout the year, and prices hovered constantly around the actual cost of production. On account of the slight demand and the very low prices ruling, we were not justified in operating but one of our furnaces, and even then found it necessary to increase the stock of pig iron on hand 30,089 tons, making total stock on hand at the end of the fiscal year 114,284 tons. We put into effect certain economies which substantially reduced the cost of iron manufactured during the year and I feel confident that we will be enabled to continue to manufacture under the reduced cost basis. The outlook for the ensuing year, based upon business already booked is very encouraging, and I am glad to report that we are in position to reap full benefit of the improvement in conditions."

Reports from Butte, Mont., state that the Anaconda Copper Company intends to make zinc production an important part of its business and that it will build a 5000-ton zinc plant at Great Falls.

The New Rate of Railroad Buying

The *Railway Age Gazette* in calling attention to railroad buying as "beginning to look like good old times," says that in its issue of Oct. 22 it reported orders for no less than 90 locomotives, 6800 freight cars, 74,500 tons of rails, making the third week in October the best for the year, with the exception of the third week in May, when the Pennsylvania placed its order for 50 engines and 16,145 cars. However, the fourth week of October made the third week insignificant, for in the former there were reported orders for 177 locomotives, 12,889 cars and 215,000 tons of rails. The orders for new locomotives in these two weeks of October had a value of approximately $8,000,000, for passenger cars $240,000, for freight cars nearly $20,000,000 and for rails $8,000,000. Up to Oct. 29 the domestic orders for freight cars totaled 71,398, as compared with 67,820 up to Oct. 30, last year, and what is most important, for the first time in 1915 orders for locomotives and freight cars passed those of 1913 for a like number of weeks.

Cars ordered in October are reported as 26,939 which is next to the total of the largest month this year. At present the buying is general and becoming weekly more active. For the first week in November the estimate is that 4150 cars were bought. The total so far this year is 108,365, as against 80,000 in 1914 and 147,000 in 1913. Orders this year will probably exceed those in 1913.

Expansion at the Japanese Imperial Steel Works

Extensions in progress at the Japanese Imperial Steel Works at Wakamatsu, according to the British Consul at Shimonoseki, comprise an open-hearth plant, a blooming mill, a bar mill, a plate mill and a benzol as well as a small zinc refining plant. The open-hearth addition consists of four furnaces, a mixer, ten gas producers and ten cranes of various sizes. The blooming mill is German, but the plate mill has been awarded to the Japanese representatives of an American firm. The benzol plant has been placed with a British firm. With the extensions completed, the capacity of the entire plant per year is estimated at 60,000 tons of rails, 150,000 tons of shapes and bars, 80,000 tons of plates and sheets, 35,000 tons of wire rods and 25,000 tons of miscellaneous steel products. The benzol output is put at 2400 tons and the refined zinc at 180 tons. The output of finished steel for the fiscal year 1914-15 was 230,239 tons.

In order to cope with the ore which is expected to be available from the Han Yeh Ping mines in North China, a further extension, to be spread over six years, is contemplated at a cost of £3,500,000. As to the preference apparently shown to other than British manufacturers the statement is made that British bids were too high, compared with the American.

The Allis-Chalmers Mfg. Company, Milwaukee, Wis., added 360 men to its payroll in October and is now employing approximately 5200 workmen. The operations are on the basis of 80 per cent. At the main offices in West Allis, it is stated that business is growing steadily in nearly every department.

A further advance of $3 per ton has been made in prices of all kinds of chain. The market is very strong and likely to be higher. The price on ¾ and 13/16 in. straight link proof coil chain in effect at this writing for delivery over the remainder of this year is $2.70 per 100 lb., f.o.b. Pittsburgh.

It is now expected that mill operations at the plant of the Minnesota Steel Company at Duluth, Minn., will be started Nov. 17. The coke ovens produced the first coke Oct. 25, and on Nov. 6 the first ore for the blast furnaces was received from the mines.

The Standish Chain Company, Kent, Ohio, which recently established a new plant, has elected the following officers: President, G. O. Farquharson; vice-president, W. S. Kent; secretary and treasurer, J. G. Woodward.

Possible Tax on War Munitions

WASHINGTON, D. C., Nov. 10, 1915.—(*By Wire.*)—The Administration has undertaken an investigation to determine the practicability of a tax on war munitions and the amount that could be raised by such a levy. The Secretary of the Treasury has instructed the Commissioner of Internal Revenue to forward to each collector detailed schedules to be filled out by each plant in his district now making war material, showing kinds, quantities and values.

The prospect for such a tax is yet in embryo, as the Treasury Department is canvassing the possibilities of many different methods of raising much needed additional revenue. The officials are making a special inquiry to ascertain whether the burden of the tax would fall on the domestic manufacturer or on his customers, the belligerent foreign governments, and to this end pending contracts will be inquired into. The Department's best information is that under existing contracts the manufacturers would have to pay the tax, but that, if the levy should be proposed to Congress, all future contracts would be made at figures advanced to include the tax. It is understood that all material made for the United States would be free of tax.

As a method of collecting a munitions tax to be paid by the foreign consumer, it has been proposed to require it to be paid, not at the factory, as is done with all other internal revenue taxes, but on the exportation of the goods, the understanding being that title to munitions passes to the purchaser at the port of exit before shipment. This suggestion is not likely to be seriously entertained for the reason that the constitution expressly prohibits the levying of a tax on exports.

Regarding an intimation that manufacturers might refuse the information sought by the Government through the collectors of internal revenue, it should be said that this is quite improbable, as any well-informed attorney would advise his clients that inasmuch as the Government has the undoubted right to levy such a tax, it follows that it has the right to take all necessary steps to obtain information to be used as a basis for determining the amount to be realized and the best method of making the assessment. W. L. C.

A Crisis in the Chinese Lead Market

A crisis has developed in the lead trade in China, according to Consul General George E. Anderson of Hong Kong. The importation of lead is practically cut off because the Australian Government as a war measure has stopped the export of lead so that the Hong Kong and all other Chinese markets are in serious straits.

Lead pigs and bars imported into China in 1914 amounted to 7250 net tons, valued at $577,597, as compared with 7502 tons in 1913, valued at $562,176. Sheet and tea lead imported in 1914 was 230 tons. Nine-tenths of these imports came from Australia. Arrivals of lead this year have amounted to only 3000 tons, and the price has been about $112 per ton as compared with $68 a year ago. The effect of this shortage is felt particularly in the tea trade, a large quantity of lead being used for manufacturing lead sheets to line tea chests.

The Davis Mfg. Company, Milwaukee, Wis., manufacturer of heavy-duty gasoline motors for motor trucks, railroad equipment, etc., is occupying its new works at Fifty-seventh Avenue and Mitchell Street, West Allis. Practically all the equipment of the former plant at Fifteenth Avenue and Park Street, Milwaukee, has been moved to the new shops, but the downtown plant will not be wholly abandoned until the end of the year.

Hotels for employees and guests will be erected, one at Edwards, N. Y., by the Northern Ore Company, and the other at Standish, N. Y., by the Northern Iron Company, in order to provide comfortable housing and feeding, which is not available in small and remote communities.

Fire at Bethlehem Steel Company's Plant

The north and east wings of the No. 4 machine shop of the Bethlehem Steel Company, South Bethlehem, Pa., suffered damage by fire on the morning of Nov. 10.

The shop is a four-story brick and steel building, and the wings in which the fire started are 60 x 340 ft. in size. The fire started on the first floor and was caused by a short-circuit of electric wires, igniting oil at one end of the smaller boring mills at about 5 a. m. No other shops are affected.

The following has been taken from a statement issued by Vice-President A. D. Mixsell of the company:

No. 4 machine shop was equipped with part of the smaller machine tools used in ordnance work and while the loss is serious it will be the policy of the company to start to rebuild and replace. The shop normally employs about 1500 men, who will of course be used to advantage in other shops of the plant. It is not possible at this writing to make an estimate of the loss. Splendid aid was given in getting the fire under control by the different borough fire departments working in conjunction with the steel company's fire department and high-pressure system.

Steel Corporation Orders Show Largest Gain

An increase of 847,834 tons is shown by the statement of the Steel Corporation's unfilled orders as of Oct. 31, the total being 6,165,452 tons, as compared with 5,317,618 tons on Sept. 30. The largest previous total of unfilled orders in recent years was 6,324,322 tons on May 31, 1913. The amount a year ago was only 3,461,097 tons. The following table shows the unfilled tonnage for each month, beginning with the high point of Dec. 31, 1912:

Oct. 31, 1915	6,165,452	Apr. 30, 1914	4,277,068
Sept. 30, 1915	5,317,618	March 31, 1914	4,653,825
Aug. 31, 1915	4,908,455	Feb. 28, 1914	5,026,440
July 31, 1915	4,928,540	Jan. 31, 1914	4,613,680
June 30, 1915	4,678,196	Dec. 31, 1913	4,282,108
May 31, 1915	4,264,598	Nov. 30, 1913	4,396,347
April 30, 1915	4,162,244	Oct. 31, 1913	4,513,767
March 31, 1915	4,255,749	Sept. 30, 1913	5,003,785
Feb. 28, 1915	4,345,374	Aug. 31, 1913	5,223,468
Jan. 31, 1915	4,248,571	July 31, 1913	5,399,356
Dec. 31, 1914	3,836,643	June 30, 1913	5,807,317
Nov. 30, 1914	3,324,592	May 31, 1913	6,324,322
Oct. 31, 1914	3,461,097	April 30, 1913	6,978,762
Sept. 30, 1914	3,787,667	March 31, 1913	7,468,956
Aug. 31, 1914	4,213,331	Feb. 28, 1913	7,656,714
July 31, 1914	4,158,589	Jan. 31, 1913	7,827,368
June 30, 1914	4,032,857	Dec. 31, 1912	7,932,164
May 31, 1914	3,998,160		

High Cost of Plumbago Crucibles

Crucible steel manufacturers are facing high costs because of the advancing prices for plumbago crucibles, caused by reduced importations of plumbago or graphite, due to the war. The following Government statistics show the recent declines in our importations of graphite:

	Gross Tons	Value
Year ended June 30, 1915	17,068	$1,387,873
Year ended June 30, 1914	24,868	1,846,126
Year ended June 30, 1913	25,222	1,972,177
Eight months ended Aug. 31, 1915	12,140	1,035,929
Eight months ended Aug. 31, 1914	14,182	977,560
Eight months ended Aug. 31, 1913	16,456	1,320,387

This is a falling off in imports of 32 per cent for the fiscal year. It is stated that the price has advanced to about $5.50 per crucible, which is more than double that before the war.

The Franklin County court has made permanent the temporary receivers appointed recently for the Flinchbaugh Mfg. Company of Greencastle, Pa., formerly of York. It was announced in court that the Landis Tool Company, Waynesboro, Pa., is negotiating for the purchase of the Flinchbaugh plant.

The United Smelting & Aluminum Company has completed its plant at New Haven, Conn. The equipment includes 17 melting furnaces for turning out aluminum ingots, alloys, etc.

Customs Decision

VALUATION OF FOREIGN MACHINERY

Some interesting points regarding the discount allowances to be made on English machinery imported into this country, as a basis for assessing duty, are presented in a reappraisement by Judge Fischer of the Board of United States General Appraisers. The machinery, which was entered at New York, was manufactured by George Mann & Co., Leeds, and comprised quadruple, crown, two-color rotary offset machines complete; double Demy proving press printing machines complete, and extra quadruple Demy two-color rotary offset lithographic printing machines complete. Following the usual customs practice in cases involving valuation, the United States authorities refused to divulge the name of the importers.

The invoices showed some of the machines to have, each, a foreign market value of $8,750. The importers claimed that a discount of 33½ per cent should be allowed from the invoiced prices, whereas the appraiser of the port allowed only 10 per cent. An appeal then followed to the reappraisement division of the general board. It was brought out at the hearing before Judge Fischer that the local appraiser's failure to allow the 33½ per cent discount resulted actually in a heavy advance in the duty collected on the presses. The advance by the appraiser was based on a special treasury agent's report which showed that the per se prices on the invoices agreed with the selling prices in England, but that on all sales for home consumption a discount of only 5 per cent is allowed to purchasers, while for export to agents a greater discount is granted. The report set forth, further, that the prices in England include the setting-up of the presses which represents an expenditure of about 5 per cent. This 5 per cent added to the 5 per cent allowed on home sales made the discount allowed by the appraiser. The importers claimed that there were no wholesale transactions in England for these machines, they being only sold there to consumers in single lots. As no proof of cost of production or selling prices in the United States was offered to sustain the importers' contentions, Judge Fischer sustained the appraiser in disallowing the high discount claimed by the importers.

By-Products from Coke Ovens in 1914

By-products from retort coke ovens in the United States in 1914 included 61,000,000,000 cu. ft. of gas, worth $6,000,000, and 110,000,000 gal. of tar, worth $2,800,000, as well as $7,600,000 worth of ammonia and $1,000,000 worth of benzol. But 57 per cent of the coke output of the country, 35,000,000 tons, comes from beehive ovens. About two-thirds of the gas saved is used industrially, but over 50,000,000 cu. ft. is sold daily for domestic purposes. Almost the entire gas supply of some cities is from retort coke ovens, such as Boston, Indianapolis, Baltimore, South Chicago, Milwaukee.

Benzol Output of By-Product Coke Ovens

In a statement before a monthly meeting of the Engineers' Society of Western Pennsylvania, Dr. Horace C. Porter, chemist of the U. S. Bureau of Mines, said that American by-product coke ovens are expected to be producing before the end of 1915 about 25,000,000 gal. of crude benzol or light oil annually—an increase of 150 per cent in about a year, due to war conditions. The amount necessary to make all the dyes and refined coal tar chemicals (except explosives) used in the United States is not over 5,000,000 gal. per year.

A business increase in September of 95 per cent over what it was in the same month last year is reported by the Timken Roller Bearing Company, while the increase of October, this year, over October, 1914, is given as 120 per cent. The increase, according to Heman Ely, secretary of the company, has come from automobile manufacturers and other domestic users.

Magnesite and Chrome Ore Imports

That the war is continuing to seriously affect our imports of magnesite and chrome ore is shown by the following Government data recently issued:

	Imports of Magnesite, Gross Tons	Imports of Chrome Ore, Gross Tons
August, 1914	7,851	6,010
August, 1915	2,376	11,534
Eight months ended Aug. 31, 1913	112,010	45,779
Eight months ended Aug. 31, 1914	90,582	48,081
Eight months ended Aug. 31, 1915	19,287	30,089

This is a falling off of 80 per cent in magnesite for the eight months as compared with last year and 37.5 per cent for chrome ore. The decrease for the fiscal year ended June 30, 1915, from the previous year was 54 per cent for magnesite and 41 per cent for chrome ore. Detailed figures were given in THE IRON AGE, Sept. 9, 1915.

August Exports of Zinc

August exports of zinc from the United States, with separate statistics for pigs and bars and plates and sheets, were as follows:

	Gross Tons	Value
Pigs and bars:		
From domestic ores	584	$199,101
From foreign ores	675	161,941
Plates and sheets	5,610	2,150,708
Total	6,869	$2,511,708
Eight months ended Sept. 1, 1915	71,357	16,419,720
Eight months ended Sept. 1, 1914	3,959	596,225
Eight months ended Sept. 1, 1913	6,824	921,964

In July the total was 7016 tons. In September, 1914, the exports were 17,005 tons, the record war month, while for the preceding six months they had averaged 7383 tons per month. For the fiscal year ended June 30, 1915, they were 114,593 tons, detailed figures being given in THE IRON AGE, Sept. 2, 1915.

The R. E. Parsons Company, which for the last forty-three years has conducted a gray-iron foundry in Bridgeport, Conn., has been acquired by other parties interested very closely in its product. The business was started in a very small way by R. E. Parsons, who has since continued as the controlling stockholder. Being a man of advanced years, and wishing to enjoy the fruits of his labors, he has sold his interest to Clarence E. Bilton, president Standard Mfg. Company, and Frederick Rhodes, treasurer Salt's Textile Mfg. Company. They, together with John W. Cottrell, the president of the company, will conduct the business as heretofore under the same name. The company, which has been very successful, and has established an enviable reputation in the trade, owns a large plot of ground on Helen Street, Barnum Avenue and Hallett Street, and the buildings thereon house a well-equipped foundry for the manufacture of light and heavy gray-iron castings.

F. H. Kappen & Son announce that they have established themselves at 93 West Water Street, Milwaukee, Wis. The O. L. Packard Machinery Company has turned over to them all its merchandise and machinery and in addition they will act as manufacturers' agents for wood and iron working machinery and other specialties. F. H. Kappen has long been connected with O. L. Packard, first as salesman and manager up to 1891, when the corporation was formed, then becoming its secretary and treasurer. The junior member, Ralph A. Kappen, has been active in the same business in various capacities for about five years.

The People's Savings & Trust Company, Green Bay, Wis., has been appointed receiver for the Lyons Boiler Works, DePere, Wis., recently declared bankrupt on petition of Walter D. Hawk, Chicago, who claims $80,000 on five notes. The company contested the proceedings, declaring the obligations were personal, but a jury in the United States District Court at Milwaukee upheld the contentions of Mr. Hawk.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

DELAY OF BUSINESS TELEGRAMS.—A fireproofing company in Ohio telegraphed authority to its sales agent in California to bid $20,642 for the furnishing of metal furniture for a building, but the telegraph company delayed delivery of the message with the result that a competitor was awarded the contract at $21,160 —the lowest bid filed. The sales agent sued the telegraph company for damages on the theory that if the message had not been negligently delayed he would have filed the lowest bid and would have been awarded the contract. But the California District Court of Appeals holds that there is no right o frecovery,; that it is a mere matter of conjecture, and not of certainty, that the contract would have been awarded plaintiff, especially in view of the fact that the bids were invited by a board which reserved the right to reject any bid. (McQuilkin vs. Postal Telegraph Cable Company, 151 Northwestern Reporter, 21.)

WHEN BUYER WAIVES CLAIM BECAUSE OF DEFECTS.—In this suit to recover the price of iron pipe sold defendant for installation by him in a municipal waterworks plant, it appears that the pipe was to be delivered f.o.b. cars, destination, "and to be subject to inspection of engineer of the city." Defendant counterclaimed for damages alleged to have resulted from the fact that, after installation, part of the pipe was found to be defective and was replaced by other pipe. In denying the counterclaim, it is held that the engineer must be regarded as defendant's agent for the purpose of inspecting the pipe, and that there cannot be deemed to have been any implied warranty against defects discoverable upon reasonable inspection. (Oklahoma Supreme Court, Sheffield Cast Iron Pipe & Foundry Company vs. Sherman, 150 Pacific Reporter, 1062.)

LIABILITY CONCERNING UNGUARDED MACHINERY.—The proprietor of a machine shop is not liable for injury to a workman while operating a punch press on the ground of failure to equip the machine with a guard, if it appears that a guard would not have prevented the particular accident. (Pennsylvania Supreme Court, Taschner vs. Stern, 95 Atlantic Reporter, 262.)

RISK ASSUMED AT REVOLVING SHAFT.—An employee engaged in sharpening tools on an emery wheel assumed the risk of being injured on account of obvious proximity of a revolving saw located on the same shaft only a foot from the wheel. (South Dakota Supreme Court, Schweinforth vs. Schwenk-Berth Brewing Company, 153 Northwestern Reporter, 908.)

DUTY TO INSPECT FOUNDRY APPLIANCES.—Plaintiff, a foundry employee, was injured through the breaking of an iron hook attached to a chain which was used in raising the upper half of a flask. The hook had been in use in the foundry for more than eleven years, and had become weak and brittle on account of crystallization. Held, in a suit to recover damages for the injury, that the jury was warranted in finding that the employer was guilty of actionable negligence in failing to have the hook tested to ascertain its safety. (Pennsylvania Supreme Court, Allison vs. Fitz Water Wheel Company, 95 Atlantic Reporter, 392.)

LIABILITY FOR PRICE OF SCRAP IRON.—On complaint by a buyer of scrap iron that there were several tons which could be used without being broken up at an expense of $5 per ton, the seller notified him that if he did not want the iron at the agreed price, $12 per ton, he could return it at the seller's expense. This the buyer did not do and he later disposed of all the scrap. Held, that he was liable for the agreed price, without regard to the market value of the heavy scrap. (Michigan Supreme Court, Solomon vs. Weiner, 153 Northwestern Reporter, 1058.)

EFFECT OF WARRANTIES IN MACHINERY SALES CONTRACTS.—A buyer of machinery will not be awarded legal relief for breach of warranty as to its condition if he has failed to comply with a clause contained in the contract of sale entitling the seller to notice and opportunity to remedy the defects complained of. Warranty that a threshing engine sold is built of good materials and will do good work does not extend to use of the machine as a tractor in plowing. (North Carolina Supreme Court, Bland vs. International Harvester Company, 86 Southeastern Reporter, 350.)

OBSTRUCTION OF ACCESS TO LEASED PREMISES.—Where premises were leased to be used for machine works, the lessee had a right to insist that the customary ways open to afford access to the premises be kept open, as they existed when the lease was entered into, so far as concerns matters within the control of the lessor. But the lessor is not presumed to have control of the means of ingress which extend beyond his own premises, and if such means are obstructed by the rightful owner, no right accrues to the lessee against the lessor because of such obstruction, unless the lessor has specially contracted that the ways shall remain open. So, defendant lesseee could not avoid liability for rent under the lease on account of removal by a railroad company of the part of a platform of the leased warehouse which encroached upon the right-of way, although the removal rendered the remainder of the platform inadequate for loading and unloading machinery. (Washington Supreme Court, Johnson-Lieber Company vs. Berlin Machine Works, 151 Pacific Reporter, 778.)

RIGHT TO SPECIFICALLY ENFORCE CONTRACT.—Although, as a general rule, courts will not compel specific performance of a contract, excepting contracts to convey land, and not then if the contract is not equitable, the ordinary legal remedy by one aggrieved by breach of contract being a claim for damages, suit will lie to compel performance of an agreement to sell majority stock of a corporation, where the sole inducement for the purchase is to obtain control of a patent owned by the company. But, under the ordinary contract for sale of stock in a manufacturing corporation, if the stock is easily obtainable in the market and there are no particular reasons why the purchaser should have the particular stock contracted for, he is left to his action for damages. (Delaware Court of Chancery, United States Fire Apparatus Company vs. G. W. Baker Machine Company, 95 Atlantic Reporter, 294.)

EMPLOYEES' PERSONAL INJURY ACTIONS IN GEORGIA.—Under the laws of Georgia, an employer, except railroad companies, is not liable for injury to a workman resulting from negligence of a fellow servant. Nor can there be recovery for injury resulting from a co-employee's incompetency for his work, if the injured man had equal means with the employer of knowing of such incompetency. And, to warrant recovery, the plaintiff must not only show that the employer was negligent, but must establish the fact that he himself did not know of the danger resulting in the accident and could not have known of it in the exercise of ordinary care of his own safety. An adult employee will be presumed to know of all apparent defects and dangers surrounding his employment after he has been at work in their presence for a reasonable time. (Georgia Court of Appeals, Kilgo vs. Rome Soil Pipe Mfg. Company, 86 Southeastern Reporter, 82.)

PATENT INFRINGEMENT SUITS AGAINST DEALERS.—In a suit against dealers for infringement of complainant's patent by selling a competing device, the burden is on the defendants to either show that the articles sold by them are covered by a license from the patentee, or that the patent has been released or removed. (United States Circuit Court of Appeals, Ninth Circuit, Sherman, Clay & Co., vs. Searchlight Horn Company, 225 Federal Reporter, 497.)

TIME FOR OBTAINING PATENT.—Under the patent law, which requires application for a patent to be made within two years after the invented device is placed "on sale," a completed sale, with or without delivery, is not required; an offer to sell, made to a prospective purchaser after the experimental stage has been passed, the invention reduced to practice, and the apparatus manufactured, in its perfected form, is a placing on sale within the statute. (United States Circuit Court of Appeals, Seventh Circuit, Wende vs. Horine, 225 Federal Reporter, 501.)

Machinery Markets and News of the Works

FOREIGN DEMAND CHANGES

English and French Buying Tapering Off

Domestic Inquiry Improving and More Business with Canada Indicated—Strike Troubles Nearer Solution—Plants Are Expanding

Foreign business is undergoing a change which already has made itself felt in various parts of the country. There are definite indications that England will be less active as a buyer in the next few months. Business with France is tapering off, also, but that with Russia shows a tendency to increase. Great hopes are being founded, and with ample justification, on future trading with Russia. Domestic buying is better in some of the important centers, the demand being varied and coming from widely scattered sources. The labor situation continues to improve practically everywhere and as a result the trade at large is feeling better. Normal conditions are expected soon in Cincinnati where several firms are solving their labor difficulties, although in Hamilton, Ohio, the situation is still bad.

Heavy war buying has eased off in New York, though a renewal is probable as soon as the large Canadian shell orders are placed. It is reported that the Canadian Shell Committee will be reorganized. A plan is contemplated for the establishment by the British Government of ordnance works which will be turned over to the Dominion after the war. Difficulty is now being experienced in placing orders for large-sized high-explosive shells.

The Splitdorf Electrical Company, Newark, N. J., plans the construction of a factory containing 100,000 sq. ft. The International Arms & Fuse Company, Bloomfield, N. J., is erecting a building 100 x 123 ft., and has plans for another 100 x 400 ft. The Brown Lipe-Chapin Company, Syracuse, N. Y., maker of automobile gears, has let a contract for a six-story building, 75 x 150 ft., to cost $100,000. The American La France Fire Engine Company has let a contract for an extension to its plant. The John E. Thropp's Sons Company, Trenton, N. J., has plans for an addition to its machine shop.

Several plant extensions are planned in New England, including buildings for the New England Westinghouse Company, the Coe Brass Company and the Standard Mfg. Company.

The machine-tool demand is active in Cleveland, and the conditions there are reflected by the action of a Cleveland manufacturer in buying a boring mill for delivery in ten months. The Lake Shore Railroad has taken bids for ten large machines for its Elkhart, Ind., shops. The Akron, Ohio, rubber companies are buying mold-making machinery. It is reported from Lima, Ohio, that the East Iron & Machine Company has taken a contract for rifle and cartridge machinery to the value of $2,000,000. Several good inquiries are out in the Chicago market. In Milwaukee the tension continues great, although there is noted a slight slackening in the demand. No labor difficulties have been encountered in that city, although agitation is going on. The domestic demand is improving in Cincinnati. The Davis Sewing Machine Company, Dayton, Ohio, will make additions which will double its capacity.

The St. Louis market is swept bare of stock, and prices count for little where tools are urgently needed. Demand is more active on the Pacific coast. Over 3000 men are employed by the Union Iron Works, San Francisco, and the plant will be busier this winter than at any time in the past ten years.

The Canadian Ingersoll-Rand Company, Sherbrooke, Quebec, will build a machine shop at a cost of $50,000.

New York

NEW YORK, Nov. 10, 1915.

With those who handle a variety of machine tools business continues very good, with a growing demand from industrial sources. In the past week a few small inquiries have come from the railroads who have been placing large orders for rolling stock and track supplies. In one or two cases they have placed orders for machines on which bids have been in for months and now they must wait four or five months for delivery. Firms who do business with the railroads find that they are paying their bills more promptly than was the case a few months ago.

In the buying of large groups of tools for the manufacture of war munitions there has been less activity in recent days, but this is welcomed by both manufacturers and their representatives in view of the strain under which they have been and the filled-up condition of the shops. The ending of labor troubles in many places, particularly in Cleveland, has created a better feeling in the entire trade, as the one great problem continues to be getting machines to sell. A large number of machine-tool builders have decided that as soon as they can make the necessary adjustments they will reserve 25 per cent of their output for the purely domestic trade.

The demand from England is tapering off, and France is buying less also, but Russia continues a heavy purchaser. It is conceded generally that the Russians for some time will be heavy purchasers in this country. Several are now here with purchasing commissions, while export houses are active in their behalf also. Regret continues to be heard that some of the newcomers in the machine tool field are not maintaining the high standards of design and construction which had been established by regular manufacturers. A member of the trade who recently returned from France encountered much complaint there, because some shippers here have neglected to send with their machines one or more essential parts, carelessness, or worse, which will be inimical to holding customers who, prior to the war, bought of other countries.

The large shell orders to be placed in Canada, and to some extent in the United States, have instigated some tentative inquiry from those who hope to get contracts, but definite inquiry is still to come from many.

The Davis Machine Tool Company, Inc., Rochester, N. Y., which took over the W. P. Davis Machine Company of that city, as stated in THE IRON AGE last week, will have a capital stock of $750,000. Like many others the company has had a strike on its hands.

Melchior, Armstrong & Dessau, 116 Broad Street, New York, are in the market for three large machines for punching and shearing work, as follows:

A punching and shearing machine for plates up to 1¼ in., with a crane suitable for handling plates weighing 2½ tons and with a radius of 10 to 12 ft.

An angle-iron punching machine for vertical and horizontal work, capable of punching angles with a 5-in. side and ⅝ in. thick.

A punching and bending machine, combined with shears for punching angles up to 5 x 5 x ⅝ in.; also channels and ship building sections up to 10 in.

The British Government, through J. P. Morgan & Co., New York, has placed an order with the General Railway Signal Company, Rochester, N. Y., for shells and war munitions totalling between $7,000,000 and $8,000,000. To fill the order the local company is building an auxiliary plant and will employ 500 additional men.

The American Abrasive Metals Company, 50 Church Street, New York City, is erecting a foundry, 80 x 182 ft., of brick construction, at 46 Coit Street, Irvington, N. J., at a cost of about $10,000. It will be used for the manufacture of stair treads, floor plates, brake shoes, etc. Ralph S. Edmondson will be superintendent.

It is reported that the C. & G. Cooper Company, Mount Vernon, Ohio, the Wheeling Mold & Foundry Company, Wheeling, W. Va., and the C & C Electric & Mfg. Company, Harwood, N. J., have made arrangements for the manufacture of electrically driven lathes. The C. & G. Cooper Company builds engines.

John H. Gibson, of Petrograd, Russia, who is at the Hotel McAlpin, New York, in addition to wanting steel-works equipment, is seeking a large number of machine tools. Nickolas Makarevitch, M.E., representing the Duflon Construction Company, Petrograd, is at the Hotel Bristol, New York, and also is interested in machine tools and other equipment.

The Splitdorf Electrical Company, 98 Warren Street, Newark, N. J., manufacturer of ignition apparatus, plans the construction of a six-story factory, 60 x 300 ft., which will add 90,000 sq. ft. to the floor space of its plant. The present building, which has been in use about three years, is now operating with an outfit of 1500 magnetos a day, and it is planned to increase this to 2000 a day by means of the increased facilities.

The Merchants' Refrigerator Company, 161 Chambers Street, New York, has acquired from the Consolidated Gas Company the block bounded by Tenth Avenue, Marginal, Nineteenth and Seventeenth streets, at a reported expenditure of about $1,000,000, and will erect a ten-story cold-storage building upon the site. It will contain about 5,000,000 cu. ft. of space. J. B. Snooks's Sons are preparing plans.

It is reported that the munition plant of the American Can Company under construction at Kenilworth, N. J., will be ready for occupancy in December. From 300 to 400 men will be employed.

The International Arms & Fuse Company, Bloomfield, N. J., has filed plans for an additional building, 100 x 400 ft., to be erected at a cost of $80,000. It is now building its second building, 100 x 123 ft.

Walter O. Snelling, chemist, 7440 Finance Street, Pittsburgh, Pa., who maintains laboratories containing about 50,000 sq. ft. of floor space, has purchased a site on Locust Street near Foster Avenue, Long Island City, N. Y., 95 x 161 ft., where he will erect laboratories.

The Lionel Mfg. Company, 365 Ogden Street, Newark, N. J., has purchased a site, 225 x 228 ft., on South Twenty-first Street, near Clinton Avenue, Newark, where it will erect a two-story concrete toy factory. J. L. Cowen is president.

The Lucas-Tuttle Mfg. Company, Silver Springs, N. Y., recently incorporated, will manufacture rulers, fan handles, advertising specialties, etc., not boxes, as has been reported.

The E. I. Du Pont de Nemours Powder Company, Wilmington, Del., has taken out a permit for the erection of a plant for the manufacture of nitrates, to be located on the lands leased from the Niagara Falls Power Company, Niagara Falls, N. Y.

The factory addition to be erected by the Modern Machine Tool Company, Albany, N. Y., is to be 125 x 200 ft., one story.

The Gowanda Light & Power Corporation, Gowanda, N. Y., has been incorporated with a capital stock of $100,000 to manufacture electricity and will build a plant at Gowanda. The incorporators are G. M. Gest, E. Wisnowski, 113 West Eighty-fourth Street, New York City, and G. A. Larkin, Olean, N. Y.

A machine shop and garage, 30 x 90 ft., is to be built on North Lexington Avenue, White Plains, N. Y., by William W. Reid.

An oil refining plant is to be built at North Warren, N. Y., on 40 acres of land secured by the Conewango Refining Company, of which U. G. Lyons is president.

The Guarantee Pump Company, Rochester, N. Y., has been incorporated with a capitalization of $100,000 to manufacture pumps, etc. James and George W. McKenzie, Jr., Rochester; John L. Conrad and Eugene S. Hoopes, Beaver, Pa., and R. B. Sargent, Staunton, Va., are the incorporators.

Plans have been filed by the Sterling Engine Company, Niagara Street and Auburn Avenue, Buffalo, N. Y., for a one-story brick addition to its machine shop to cost about $10,000. New equipment will be installed.

The George Miller Spring Tire Company, Buffalo, N. Y., has been incorporated with a capital stock of $100,000 and will establish a plant for the manufacture of tires, springs, etc., for automobiles and other vehicles. G. and O. Miller and W. L. Williams, Buffalo, are the incorporators.

The General Abrasive Company, recently organized at Niagara Falls, N. Y., has purchased a site in the industrial section in the north end of the city upon which it will at once erect an electric furnace building, 40 x 220 ft., and a three-story crushing building, 45 x 125 ft.

The Brown, Lipe, Chapin Company, Marcellus, Seneca and West Fayette streets, Syracuse, N. Y., manufacturer of automobile gears, etc., has let contract for an addition to its factory, 75 x 150 ft., six stories, to cost $100,000.

Oneonta, N. Y., is having plans prepared for a sewage disposal plant to cost about $45,000. Frank M. Gurney is city engineer.

The Dunkirk Glass Company, Dunkirk, N. Y., is building additions to its plant, 35 x 80 ft. and 90 x 72 ft.

The American La France Fire Engine Company, Elmira, N. Y., has let contract for an addition to its plant, 120 x 130 ft., two stories.

New England

BOSTON, MASS., Nov. 8, 1915.

The Mead-Morrison Mfg. Company, Boston, Mass., has a contract for 6-in. shells, for the execution of which it has bought a plant at Gloucester, Mass.

The New England Westinghouse Company will enlarge its plant at Meriden, Conn., by the addition of two one-story buildings, 80 x 200 ft. and 80 x 100 ft.

Joseph G. Ray, Franklin, Mass., has purchased land on Pond Street, Woonsocket, R. I., on which it is reported he plans to erect a three-story mill, 80 x 380 ft.

The Rockwell-Drake Corporation, Hartford, Conn., has been incorporated with authorized capital of $100,000 to manufacture bearings, automobile parts, machines, etc. The incorporators are Hugh M. Rockwell, Leon A. Drake and Rene J. Brault of Bristol and Raymond B. Bennett of Hartford.

The Bridgeport Brass Company, Bridgeport, Conn., has taken out a permit for an addition to its plant on Housatonic Avenue.

The Coe Brass Company, branch of the American Brass Company, Torrington, Conn., has awarded a contract for a new rod mill on High Street, 220 x 240 ft., one story.

The Standard Mfg. Company, Bridgeport, Conn., is to build a factory, 65 x 120 ft., three stories. It is reported that it is to abandon its structural steel business and concentrate on the manufacture of tools and machinery. The report states that the structural steel business has been sold to the A. G. Leake Erecting Company, which is building a plant near that of the Standard Company.

The Atwater Mfg. Company, Plantsville, Conn., is running some departments evenings to keep up with its large orders for drop forgings.

The H. B. Smith Company, Westfield, Mass., is building a new carpenter shop, 40 x 60 ft., one story. The space given up in the foundry building will be used to enlarge the machine shop.

The Springfield Grinding Company, Springfield, Mass., has been incorporated with authorized capital of $400,000. It will operate the abrasive plant in Chester, Mass., formerly conducted by the Massassoit Company. The plant was sold Aug. 24, 1915, under a foreclosure attachment to Dwight O. Gilmore of Springfield, who is president of the new company. A. D. Robinson, Westfield, is vice-president and C. J. Wetsel, Chicopee, treasurer. A. F. Blouin has been appointed factory manager. Frank H. Page of the National Equipment Company and the Van Norman Machine Tool Company, Springfield, is a director.

The plant of the Randall-Faichney Company, Boston, Mass., manufacturer of automobile and medical supplies, has been sold to a committee of creditors for $150,000. As soon as the consent of the court is obtained, the property will be turned over to the Randall-Faichney Company, Inc., a new corporation with authorized capital of $500,000. The incorporators are Daniel J. Lyne, Stafford F. Johnson and Stewart C. Woodworth. It is understood that Messrs. Randall and Faichney, the founders, will continue the active management of the business.

The Gardner Iron & Metal Company, Gardner, Mass., has been incorporated with capital of $15,000, by Elliott J. McKnight, Max Caplan and Abram Jaffa.

The Automatic Safety Fire Valve Company, Boston, Mass., is a new corporation with authorized capital of $95,000. The incorporators are James F. Moynihan, James

M. Thompson, Willard Massey, Bowman C. Ellis and James F. Langill.

The Scovill Mfg. Company, Waterbury, Conn., posted a notice Oct. 31, granting time and a half for overtime to all its employees employed by the day or hour. This gives the same overtime pay to all its unskilled workmen that was granted to its skilled employees several months ago. This change does not affect pieceworkers. On the same day a notice of an extra 5 per cent dividend was sent to stockholders.

The E. Ingraham Company, Bristol, Conn., has voluntarily granted time and a quarter for all time over 55 hr. to its 800 employees.

The Pequonnock Foundry, Bridgeport, Conn., is building an addition to its foundry, 48 x 75 ft., to be used for lighter foundry work and as an extension to the core room. A new cupola and other minor equipment will be added.

The new State Trade School, Putnam, Conn., will be a three-story structure, 60 x 100 ft., one portion to be equipped as a machine shop.

The Fiberloid Company, Springfield, Mass., has started work on two one-story additions, 35 x 39 and 28 ft. square.

The Reliance Metal Company, Boston, Mass., has been incorporated by Edward Wilcox, Alfred T. Woodward, George B. Buzzell, Fred Farrar and Fred Trotman with an authorized capital of $25,000.

The National Copper Works, Boston, Mass., is a new corporation with capital of $100,000. Morris Broomfield, Hubert H. Snow and John J. Connolly are the incorporators.

Philadelphia

PHILADELPHIA, PA., Nov. 8, 1915.

The Standard Chain Company, Pittsburgh, Pa., has completed its new plant at York, Pa., consisting of a main factory, 240 x 330 ft., and an auxiliary building, 60 x 420 ft., containing in all about 100,000 sq. ft. of floor space. It is installing machinery for the electric welding of chain and plans to start operations in from four to six weeks. John C. Schmidt is president and Charlton L. Hoff is plant manager.

It is stated that the Union Powder Company will construct a powder and acid plant at Salt Run, near Emporium, Pa.

The John E. Thropp's Sons Company, manufacturer of presses, tire-making machinery, etc., Trenton, N. J., has had plans drawn for an addition to complete its new machine shop, which will then be 65 x 325 ft., with a gallery on one side 23 ft. wide. It is completing a power plant which will be equipped with two 300-hp. boilers, a 450-hp. engine, with a 250-kw. generator, steam pumps and one 750-ft. air compressor, all of which have been contracted for.

The Klauder-Weldon Dyeing Machine Company has awarded contract to Charles T. Eastburn, Yardley, Pa., for the construction of its new plant at that place. It will be of brick and steel construction.

The Electric Storage Battery Company, Nineteenth and Allegheny avenues, Philadelphia, has awarded contract to the Pomeroy Construction Company, 1609 Ranstead Street, Philadelphia, for the construction of a two-story brick machine shop, 18 ft. square, to cost about $1,500.

The American Gasaccumulator Company, Perry Building, Philadelphia, Pa., has purchased six acres of land on Newark Avenue, Elizabeth, N. J., where it will erect a factory and office building for the manufacture of automatic lighting systems for marine and railroad signalling. R. Elliot is assistant treasurer.

The Weatherly Foundry & Machine Company, Weatherly, Pa., is making arrangements to install its own power plant.

The York Bridge & Construction Company, York, Pa., has been incorporated with a capital of $150,000 by Charles H. Vaughn, treasurer; Henry R. Harlenstine and James C. Childen, all of York, Pa., to construct and erect iron and steel structures.

The Alvord Reamer Company, Millersburg, Pa., is reported to have purchased the controlling stock in the Millersburg Fifth Wheel Mfg. Company, and will continue the business under the old name.

J. H. Mullen, who recently sold his foundry at Shamokin, Pa., is stated to be planning to build a new foundry and machine shop.

The Philips-Brinton Company, Kennett Square, Pa., has been incorporated with a capital stock of $100,000 to manufacture automobile parts, accessories and electrical appliances. Edwin S. Philips, Kennett Square, is treasurer, and the following are directors: E. S. Philips and William C. Brinton, Kennett Square, and Furman S. Howson, Wayne, Pa.

Fire burned the erecting and pattern shops of the Weimer Machine Works Company, manufacturer of blowing engines, blast furnace equipment, etc., Lebanon, Pa., Nov. 3. The damage has not been estimated. Other companies have offered the use of parts of their plants, and arrangements will be made to do work outside until the large planers and boring mills are repaired. A. A. Weimer is treasurer and general manager.

The Leeland Surgical Company, Conshohocken, Pa., has been incorporated with a capital of $100,000 to manufacture surgical appliances, etc. John M. Dettra, 329 DeKalb Street, Norristown, Pa., is treasurer. The directors are Maurice O'B. Hallowell, A. A. Gothwaite and H. M. Tracy, Conshohocken; Montgomery Evans, Adam Scheidt and A. S. Swartz, Norristown; J. M. Dettra; Samuel H. High, Jenkintown.

The Railway & Industrial Engineering Company, Greensburg, Pa., has increased its capital stock from $15,000 to $100,000.

Baltimore

BALTIMORE, MD., Nov. 8, 1915.

Negotiations for the sale of the P. Kennedy foundry, Charles and Wells streets, to the Baldwin Locomotive Works are off. The Baltimore plant, however, has received some sub-contracts from the locomotive works. New equipment will be installed and the large addition being built will be rushed to completion.

Plans are being made for the installation of machinery in the plant of the Spanish-American Syndicate, which will turn out guncotton. Leon Rasst, Baltimore, is manager.

With capital stock of $25,000 the Fire & Accident Prevention Company, Baltimore, has been incorporated to manufacture machinery, tools, implements, etc. The incorporators are Sylvan W. Binswanger, 1908 Bolton Street, Baltimore; Robert H. Pfeil and George L. Streb.

Machinery to cost about $10,000 will be installed in the plant of the Morris Iron & Steel Company, Frederick, Md., for the manufacture of a large order of lathes received from a Philadelphia company.

The Jamison Cold Storage Door Company, Hagerstown, Md., plans to increase its output. J. V. Jamison is secretary.

Fire badly damaged the sash, door and blind factory of Atcheson Brothers, Alexandria, Va.

With capital stock of $10,000 the Vance Motor Company has been incorporated at Chilhowie, Va. H. S. Myers is president.

With $90,000 capital stock the Vulcan Electric Corporation, Norfolk, Va., has been incorporated. H. S. Tyler is secretary.

An electric light plant will be built at Blackstone, Va., by C. E. Wilson, Crewe, Va.

The Lebanon Light Company, Lebanon, Va., has been incorporated with $5,000 capital stock. T. A. Hendricks is secretary.

Chicago

CHICAGO, ILL., Nov. 8, 1915.

There is an inquiry in this market for second-hand machinery and motors suitable for a manufacturing plant, with carpenter, pattern, blacksmith, tool, machine and punch departments.

The H. Clauss Shear Company, Tipton, Ind., is building an addition to its plant and is in the market for sensitive drills, electroplating equipment, polishing and buffing machines, motors and shafting.

The Clear Lake Lumber Company, Clear Lake, Wash., is in the market for a heavy duty Corliss engine, 28 x 48 in., or its equivalent in a twin tandem unit. Equipment must be in good condition.

The Coast Culvert & Flume Company, Portland, Ore., advises that it has just purchased a 30,000-lb. press and a 16-ft. shear, which with other new equipment is being installed in the addition to its plant. The company built its recent addition for the manufacture of smooth pipe for irrigation and water purposes, using both black and galvanized sheets. The company also is engaged in general tank work.

The McDonald Machine Company, 3207 Shields Avenue, Chicago, is remodeling its plant and building an addition.

The Electric Metal Refining Company, Chicago, has been organized with a capital of $4,500 by Bernhard Stenge, South Dearborn Street; Walter Myer and Edward S. Glickauf.

The Excelsior Steel Furnace Company, 517 West Monroe Street, Chicago, has purchased 83,000 sq. ft. of property on Goose Island, near Halsted and Division streets, for the establishment of a new plant.

The U. S. Ball Bearing Company will build a one-story brick powerhouse, 49 x 58 ft., at 2147-59 North Kolmar Avenue, Chicago, at a cost of $15,000.

The Delta Star Electric Company, Chicago, has had plans prepared by R. G. Pierce for a one-story brick factory to be erected at 2433 Fulton Street at an estimated cost of $16,000.

Davidson, Lockwood & Weiss, architects, Monadnock Building, Chicago, have prepared plans for one three-story factory, 107 x 120 ft., to cost $50,000, and a one and two-story factory which is the first unit of a large manufacturing plant, both buildings to be located at Clearing, Ill.

The Vaughan & Bushnell Mfg. Company, 2130 Carroll Avenue, Chicago, manufacturer of hardware forgings, is building a four-story addition.

The Western Mfg. Company, Peoria, Ill., has been incorporated with a capital stock of $25,000 by O. S. Rippeth, G. A. Rippeth and J. C. Pitcher. The Illinois Enamel Ware Company will be merged into the new corporation, which, it is understood, will locate a factory in Peoria.

The Western Boiler Pipe Company, Monmouth, Ill., has been organized by J. H. Jayne, E. E. Wood and H. E. Miller. It has a capital of $100,000.

The New Monarch Machine & Stamping Company, Des Moines, Iowa, is building a factory 115 x 200 ft., to cost $200,000.

The Minneapolis Steel & Machinery Company, Minneapolis, Minn., will erect a one-story factory 140 x 356 ft., at 2906 Minnehaha Avenue, at an estimated cost of $60,000.

The Hassell Iron Works and the Dourte Valveless Pumping Company, Colorado Springs, Colo., have combined and will hereafter be known as the Dourte-Hassell Mfg. Company. The capital stock of the new company is $500,000. G. J. Dourte is president.

On Nov. 12 Wheaton, Ill., will vote on waterworks improvements to cost $35,000, including two centrifugal pumps of 750 gal. per min. capacity, 70-ft. head; two two-stage centrifugal pumps, 500 gal. per min., 190-ft. head; one booster pump, 500 gal. per min.; 200,000 gal. elevated steel tank; 100-hp. gas engine and 1700 ft. of 12-in. cast-iron pipe L. J. Rudolock is city engineer

Milwaukee

MILWAUKEE, WIS., Nov. 8, 1915.

A slackening in demand for machine tools has not relieved the high tension. Builders continue day and night schedules and are putting on more men in order to make deliveries. Buyers hesitate to place orders for more tools as requirements cannot be granted before the expiration of five to six months, at least. Makers of specialized lines feel the benefit of improved conditions, due to domestic requirements rather than for war material. A close analysis of conditions, however, shows that war business is the foundation of the general improvement. No labor difficulties have been encountered as yet, although agitation goes on with increased vigor. The railroads are coming into the market slowly and not must business has developed as yet, although the outlook for a brisk demand is promising, but the question of deliveries is causing uneasiness.

The A. J. Lindemann Hoverson Company, Midland and Cleveland avenues, Milwaukee stove and sheet metal works, has awarded contracts for an enameling shop, 135 x 160 ft., one-story, to cost about $20,000. Daniel B. Danielson, 874 Layton Boulevard, is general contractor.

The Racine Rubber Company, Racine, Wis., manufacturer of tires and rubber goods, has broken ground for a three-story addition at Racine Junction to cost about $75,000. It will be 52 x 77 ft., to be used for mill room and crude rubber storage and will be ready Feb. 1.

The Valley Electric Light & Power Company, Black Hawk, Wis., has been incorporated with a capital stock of $7,500 by A. George Barber, Oscar A. Jaeger and Lucile Barber.

The Sterling Motor Truck Company, formerly the Sternberg Motor Truck Company, West Allis, Milwaukee, has increased its capital stock from $250,000 to $350,000. It has under way a shop addition and is making other extensions. Victor L. Brown is president and Robert G. Hayssen, secretary.

Figures on an addition, 70 x 100 ft., 40 ft. high, to the steam-hydroelectric power plant of the Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., will be taken Nov. 15 by Woodmansee & Davidson, consulting engineers, First National Bank Building, Chicago, Ill. The enlargement is to provide for the greater output of its hydroelectric plant north of Appleton and to make additional provision for auxiliary steam power. E. J. Ellis, 78 College Avenue, Appleton, is general manager.

The Enger Motor Sales Company, organized at Milwaukee with $10,000 capital will establish a garage and service station on Eleventh Street, near Grand Avenue. Robert D. Mitchell is manager.

Kamschulte & Webster, consulting engineers, 306 Merchants & Manufacturers' Bank Building Milwaukee, are taking bids for a garage and service station at Broadway and Martin Street, 50 x 120 ft., two stories. The name of the owner and occupant is withheld.

The Federal Realty Company, Milwaukee, will build a garage and repair shop costing $22,000 at 159-161 Oneida Street, to be occupied by the Schreiber-Boorse Motor Car Company, now at 190 Fifth Street, Milwaukee.

Sealed bids for the construction and equipment of a municipal waterworks plant and system for Melrose, Wis., will be taken until Dec. 1 by Z. V. P. Guilbert, village clerk. Plans have been completed by W. G. Kirchhoffer, consulting engineer, Madison, Wis.

Matthew J. Rademacher, 2807 Vliet Street, Milwaukee, will erect a shop addition, 30 x 120 ft.

L. E. Haelffrisch, Reedsville, Wis., will erect a garage and machine shop, 40 x 80 ft., two stories.

Keller & Barbeau, Fond du Lac, Wis., will establish a garage and machine shop at Butternut, Wis., under the style of Butternut Auto Company. A building is now being erected.

O. F. Brewer is establishing a machine and automobile repair shop in the Kentzler Building, 107-111 East Doty Street, Madison, Wis.

The Dicke Motor Car Company, Manitowoc, Wis., will establish a branch garage and repair shop at Two Rivers, Wis., under the name of Two Rivers Auto Supply Company. It will specialize in Ford work.

The South Side Service Station, Milwaukee, has been incorporated with a capital stock of $3,000 by T. R. Berninger, Fred J. Theleman and F. J. Berninger to operate an automobile and general machine shop and garage.

Adolph Kummerow, Two Rivers, Wis., has organized the Auto Service Company and is establishing a garage and repair shop.

The Racine Iron & Wire Works, Racine, Wis., was damaged $7,500 by fire Nov. 1. Most of the loss was on machinery and finished stock. Replacement will be made at once. George L. Buck is president.

D. E. Moulton and E. V. Sexsmith, Fond du Lac, Wis., have organized the Guarantee Repair Company to do a general machinery, automobile and electrical repair business. A shop has been established at 51-53 West Second Street.

The American Brewers & Bottlers Specialty Company, 764 Windlake Avenue, Milwaukee, has entered the motor car accessory field and is specializing on gasoline tanks, its equipment being especially adapted to handle this class of work.

Articles of incorporation have been filed by the Lowell Light & Power Company, Lowell, Dodge County, Wis. The capital stock is $10,000 and the incorporators are G. O. Pease, E. J. Pease and W. F. Pease.

The Reeseville Heat, Light & Power Company has been organized at Reeseville, Wis., with $10,000 capital stock by R. J. Bues, J. O. Meyers and G. C. Schmidt.

Indianapolis

INDIANAPOLIS, IND., Nov. 8, 1915.

The Karges Wagon Company, Evansville, Ind., has turned down an order for wagons from the British Government because the plant is running overtime on domestic business. The working force has recently been doubled.

The Evansville Tool Works, Evansville, Ind., has just received a large order from Petrograd, Russia, for hatchets, hammers, blacksmith's tongs, cleavers, anvils, small axes and sledges, to be shipped by way of Archangel.

Michigan City, Ind., has voted for a bond issue of $75,000 for funds with which to enlarge and improve its waterworks plant.

The Western Gas Construction Company, Fort Wayne, Ind., is rebuilding its foundry, which was destroyed by fire a few weeks ago. The new structure is of steel and reinforced concrete and is expected to be completed about Dec. 15.

The Bowser Oil Tank & Pump Company, Fort Wayne, Ind., is erecting a three-story addition to its plant to be used as a testing room.

The Oxygenated Stove Company, South Bend, Ind., has been incorporated with a capital of $50,000 by Albert W. Craig, John E. Serrells and Floyd A. Deahl.

The National Products Company, Indianapolis, Ind., has been incorporated with $1,000,000 capital stock to manufacture articles from clay, stone, etc. The directors are August M. Kuhn, Adolph Levy and Oliver E. Hawn.

The Howe & Shipley Company, Lafayette, Ind., has changed its name to the Shipley Hardware Company.

The Industrial Association of Michigan City, Ind., has closed a contract with the National Picture Frame & Lamp Company to establish a factory there. A building of the Midland Chair & Seating Company will be occupied by the new company, which manufactures metal picture frames, lamps, pedestals and furniture specialties.

J. D. Browdues, Martinsville, Ind., will establish a factory at Vincennes, Ind., for making automobile tops and bodies, particularly delivery beds.

The Helfrich Lumber & Mfg. Company's saw mill at Evansville, Ind., was destroyed by fire Nov. 2 with a loss of $150,000 on the mill and part of the lumber yards.

A. L. Brocksmith, president of the Bicknell Light & Power Company, is one of the promoters of an electric light and power plant to be built at Apraw Ferry, near Bicknell, Ind., at a cost of $1,000,000.

Nashville, Ind., voted, Nov. 2, a bond issue of $7,000 for an electric plant.

The Hebron Light, Heat & Power Company, Hebron, Ind., has been incorporated with $25,000 capital stock to operate an electric power plant, etc. The directors are F. A. Bremmer, Charles B. Alyea and W. J. Mulinex.

The Wallenberger Furniture Mfg. Company, Evansville, Ind., has been incorporated with $75,000 capital stock by L. A. Wallenberger, Emil C. Grewe and C. W. Wittenbraker to manufacture furniture.

The Peru Chair Works, Peru, Ind., has been incorporated with $150,000 to manufacture furniture. Richard E. Edwards, Richard A. Edwards and Percy A. Shepard are the directors.

Cleveland

CLEVELAND, OHIO, Nov. 8, 1915.

The demand for machine tools continues active, orders coming from widely scattered sources representing about all metal-working industries. Most manufacturing plants are crowded with work and many are buying additional machinery, some in anticipation of future requirements, owing to delay in securing deliveries. The condition of some machine-tool builders in regard to deliveries is indicated by an order just placed with a Cleveland manufacturer for a boring mill for delivery in ten months. The Lake Shore Railroad has taken bids for ten large machines for its Elkhart shops, but the order may not be placed immediately. The United Steel Company, Canton, Ohio, has placed orders for a 72-in. planing machine, 6-ft. radial drill, 24-in. shaping machine and engine lathes for machine shop equipment. The Akron rubber plants and machine shops are buying machinery for machine-shop work and mold making.

Labor troubles in Cleveland metal-working plants have entirely disappeared as a result of calling off the strikes. The Cleveland branch of the National Metal Trades Association has issued a bulletin in reference to the local strikes. Taking up the plants affected individually it refers to the number of men out, duration of the strike, etc., and in conclusion the report on each plant reads "all back to work again on exactly the same conditions as when they went out." The closing paragraph of the bulletin is as follows: "This is indeed a happy ending of a strike that never should have been called and which we have always contended was nothing more than part and parcel of a scheme to cripple the manufacturers engaged particularly in the making of war work."

The Champion Machine & Forging Company, Cleveland, will enlarge its plant and has placed orders for six trimming presses, a steam hammer and other equipment.

The Ohio Refrigerating Machine & Supply Company, Cleveland, has been incorporated with a capital stock of $10,000 by William E. Graham, Richard H. Schweitzer, and others, to manufacture machinery.

The Perfection Spring Company, Cleveland, maker of automobile springs, has increased its capital stock from $1,500,000 to $2,500,000. The only change in the organization is the addition of three names to the board of directors.

The B. F. Goodrich Company, Akron, Ohio, has commenced the erection a new machine shop. Orders have been placed for some additional machinery and probably more will be required.

The Firestone Tire & Rubber Company, Akron, Ohio, will shortly begin the erection of two buildings, and the Miller Rubber Company, Akron, will erect an additional factory.

The McNeil Boiler Company, Akron, Ohio, will add to its products the manufacture of automobile tire molds, and has placed orders for five boring mills, a heavy radial drill and other equipment.

It is reported from Lima, Ohio, that the East Iron & Machine Company, Lima, has secured a contract amounting to about $2,500,000, for the manufacture of rifle cartridge machinery.

The Crucible Casting Company, Lima, Ohio, will double its capacity by the erection of an addition, 80 x 160 ft., and will increase its capital stock from $50,000 to $100,000.

The Arrow Mfg. Company, Toledo, Ohio, maker of electrical apparatus, has broken ground for a plant at Broadway and Emerald Avenue, to cost $20,000. It will be three stories, 60 x 120 ft., of pressed brick construction.

Cincinnati

CINCINNATI, OHIO, Nov. 8, 1915.

The labor situation continues to improve so rapidly that in a short time normal conditions will prevail. The employees of the Cincinnati Grinder Company voted unanimously last week to return to work; the American Tool Works Company is now employing over 600 men, with daily additions of its former workmen. At the plant of the LeBlond Machine Tool Company, where an effort was made to call out all the men, only about 15 per cent responded. A few local machine tool plants are yet short-handed, but many of their former employees have asked to be reinstated and doubtless they will be able to resume full operations at an early date.

Unsatisfactory conditions still prevail at Hamilton, Ohio, and no change is to be noted from last week's reports. Employers are emphatic in stating that they will accord the machinists' union no recognition, and that their men must return as individuals. In Dayton, Ohio, one manufacturer of war munitions has had considerable trouble and is now working only a small force, but no general demands have as yet been made on other firms. Springfield, Ohio, manufacturers state that minor labor troubles have been adjusted and that they anticipate no further demands.

The domestic demand for machine tools is improving, but foreign business seems to be slackening up, although this may be due to the inability of machine tool builders to make prompt deliveries. Confirmation is lacking of the report that a local firm has booked an order for a number of portable houses for use on the battlefields of Europe.

The Special Equipment Company has moved its plant from 859 Hathaway Street, Cincinnati, to 800 West Sixth Street. It makes a specialty of ventilating systems, stacks and other sheet metal work. E. H. Lostetter is president.

The Automatic Electrical Tool Company, 2028 Western Avenue, Cincinnati, has tentative plans under way for adding to its manufacturing equipment. It is putting on the market a new portable electric drilling machine.

Werner & Adkins, Mercantile Library Building, Cincinnati, will soon call for bids on low-pressure boilers and laundry equipment for a new courthouse and jail to be erected at Wilmington, Ohio.

It now seems certain that car service will be secured to Bond Hill, a Cincinnati suburb, some time within the next few months. It is stated that as soon as the car tracks are laid the J. A. Fay & Egan Company will take steps to erect a large plant on a 90-acre site acquired two years ago.

The Reno-Kaetker Electric Company, Cincinnati, has increased its capital stock from $15,000 to $25,000, and will add to its manufacturing facilities. The company makes a specialty of small generators and motors. F. A. Colville is general manager.

The Standard Register Company, Dayton, Ohio, is making additions to its manufacturing equipment. Further equipment will be installed at a later date.

The Davis Sewing Machine Company, Dayton, Ohio, will make further additions to its plant that will more than double its present capacity. In addition to the company's regular business it is understood that some large contracts for finishing special forgings have lately been taken.

Work on the addition to the plant of the Nolte Brass Company, Springfield, Ohio, has been commenced and will be 50 x 210 ft., one story, of brick and reinforced concrete. All the necessary equipment has been purchased.

On Nov. 1 fire completely destroyed the flour milling plant of the Tranchant & Finnell Company, Osborn, Ohio. The factory of the Osborn Whip Company was also burned. It is understood that as soon as insurance adjustments are made both plants will be rebuilt.

The McCann & Shaw Bent Glass Mfg. Company, Columbus, Ohio, suffered a fire loss of approximately $7,500, Oct. 31. The plant will be rebuilt.

The Scioto Boiler Works, Columbus, Ohio, contemplates additions to its factory equipment.

The plant of the Krein Mfg. Company, Wapakoneta, Ohio, manufacturer of chain, acetylene generators and other specialties, was sold last week to Charles F. Herbst, A. J. Brown, and others. The purchasers will continue the business and will make some additions later.

The Eaton Lighting Company, Eaton, Ohio, has increased its capital stock from $50,000 to $80,000. Nothing is known as to plans for adding to its generating equipment.

Detroit

DETROIT, MICH., Nov. 8, 1915.

The Detroit Battery Company, Detroit, manufacturer of batteries and electrical equipment, is having plans prepared for a factory, 70 x 100 ft., three stories. Additional machinery will be required for the building, which will be completed about Jan. 1.

E. L. Benedict, Detroit, has taken out a building permit covering the erection of a two-story factory, 51 x 60 ft. Preston, Brown & Walker are the architects.

The Clayton & Lambert Mfg. Company, Detroit, manufacturer of sheet-metal stampings, is increasing its facilities by the installation of additional presses and other machinery. Its payroll will be doubled.

The Federal Motor Truck Company, Detroit, is adding a one-story boiler house, 58 x 42 ft.

The F. L. Jacobs Company, Detroit, operating an electric welding plant, has increased its capital stock from $65,000 to $100,000.

The Detroit Gear & Machine Company, Detroit, manufacturer of gears and automobile parts, has increased its capital stock from $150,000 to $500,000.

The Sturgis Steel Go-Cart Company, Sturgis, Mich., is building a two-story addition to its plant, 85 x 160 ft.

The Auto Wheel Company, Lansing, Mich., has increased its capital stock from $150,000 to $300,000.

The municipal lighting plant of River Rouge, Mich., will add a new boiler and some miscellaneous machinery to its equipment.

The Van Clerck Motor Company, Monroe, Mich., will increase its capital stock by the issue of $150,000 of additional stock. Tentative plans are being made for extensive additions to its plant.

The A. L. A. Tire Company, Flint, Mich., will shortly occupy a new plant, 100 x 275 ft., to be erected for it by the Flint board of commerce. The board of commerce has details regarding the work.

The Buick Motor Company, Flint, Mich., has announced that it will erect a new foundry, 300 x 530 ft., two stories.

The Lakey Foundry Company, Muskegon, Mich., will make additions and improvements to its plant which will double its capacity. Both the foundry and machine shop will be enlarged and additional equipment installed.

Ishpeming, Mich., has let contract to the McGuire-Hunter Incinerator Company for a plant to cost $8,885.

The Campbell, Wyant & Cannon Foundry Company, Muskegon Heights, Mich., has closed a contract with the Indiana Bridge Company, Muncie, Ind., for an addition to its plant which will cost about $100,000.

The Central South

LOUISVILLE, KY., Nov. 8, 1915.

Night shifts have become necessary in manufacturing plants and business is active in all lines. War orders have played comparatively little part in the development of local trade, and conditions have improved largely because of better domestic demand. Textile and wood-working machinery are active. Machinery and supply houses are busy, and report an improved call for both general and special equipment. Steam power machinery is selling well.

The business of A. & C. B. Robinson, dealers in railway supplies and iron and steel products, has been incorporated with $10,000 capital stock by C. B. Robinson and Avery Robinson.

J. T. S. Brown, Jr., Louisville, plans to manufacture a new double-action deep-well pump for use in the distilling trade.

C. H. Babbitt, Columbus, Ohio, will prepare plans for a water system at Flemingsburg, Ky.

W. P. Hunter, Danville, Ky., has let contract for a garage at Harrodsburg, Ky., for which equipment will be needed.

The Hull Pump & Tank Company, Owensboro, Ky., capitalized at $100,000, has advised that it will begin the erection of a plant in ninety days to manufacture automatic self-measuring gasoline and oil pumps.

W. B. Lee and John Hicks, Lancaster, Ky., have purchased control of the local electric light plant, effective Jan. 1, and are planning improvements.

The sawmill of the Continental Coal Corporation, Pineville, Ky., was burned recently with a loss of $25,000.

Russell Brothers have purchased the electric light plant and ice factory of W. J. Debaun, Perryville, Ky., and will increase its capacity.

The plant of the American Brake Shoe & Foundry Company, Chattanooga, Tenn., is operating day and night shifts.

Owing to heavy orders for box and coal cars, the working force of the Lenoir Car Works, Lenoir City, Tenn., has been largely increased. All-steel coal gondolas are wanted in quantity.

The Cleveland Table & Mantel Company, Cleveland, Tenn., has begun the erection of a building to be equipped with power and wood-working machinery. D. W. Kegler is manager.

The Butchers' Association, Jackson, Tenn., will construct an abbatoir for which refrigerating and other equipment will be needed.

Birmingham

BIRMINGHAM, ALA., Nov. 8, 1915.

The demand for wood-working machinery and electric appliances has been unusually heavy, while the regular line of pumps, engines and boilers has been quite satisfactory. Wholesale dealers could do a larger business if factories could deliver the goods in time. Second-hand machine tools, wherever found, are eagerly taken at good prices.

The Ornamental Foundry Company, Anniston, Ala., will erect a foundry, pattern shop and machine shop for the manufacture of ornamental light posts, cast-iron sectional culvert pipe, miscellaneous castings, etc. G. Schumacher is president.

The Buckeye Cotton Oil Company, Selma, Ala., has let the contract for an additional mill, 45 x 135 ft., with three boilers, etc.

S. Sherman, Sanford, Fla., will establish a boat-building plant.

Buckeye Cotton Oil Mill Company, Jackson, Miss., will establish a feed mill at a cost of about $100,000. W. G. McNair is manager.

The American Agricultural Company, 2 Rector Street, New York City, has purchased a tract at Greensboro, N. C., and will erect a fertilizer factory and warehouse at a cost of $100,000.

Homestead, Fla., has voted $40,000 of bonds for the construction of a waterworks plant.

The Brevard Cotton Mills, Greenville, S. C., is in the market for a second-hand steam power plant with engine capacity of 400 to 600 hp.

A. T. Snodgrass, Thomasville, Ga., will purchase a number of second-hand direct-current motors, ranging from 2 to 25 hp.

The Florida Soft Phosphate & Lime Company, Ocala, Fla., is in the market for a second-hand 100-hp. return tubular boiler and a 75-hp. and a 10-hp. engine; also second-hand.

The machine shops and other equipment of the McEachern-McNair Lumber Company, Meredith, Fla., were destroyed by fire Nov. 4 with a loss of $100,000.

The boilers of the M. & O. Lumber Company, New Augusta, Miss., exploded recently, wrecking the power plant and mill.

Texas

AUSTIN, TEX., Nov 5, 1915.

Fine fall weather has served to stimulate the machinery and tool trade. Orders for equipment for manufacturing plants are being placed. One of the features of the business situation is the unprecedented high price of cotton-seed, which adds enormously to the value of the cotton crop.

The Allen Cone Company, El Paso, has been organized to manufacture a machine for the separation of ores and minerals. It has a capital stock of $250,000. The incorporators are Charles Allen and A. H. Sweet of El Paso, and W. H. Winter, Hill, N. M.

The Sunset Brick & Tile Company, Gonzales, which has been organized with a capital stock of $30,000, is in the market for brick and tile-making machinery. The incorporators are R. L. Robertson, O. B. Robertson and W. T. Miller.

The Eden Gin & Fuel Company, with a capital stock of

$16,000, will build a cotton gin at Bryan. E. L. Eden is a stockholder.

E. P. Turner, Dallas, and associates, plan to build an interurban electric railway between Denton and Krum, about fifteen miles, including an electric power plant.

The Gulf, Colorado & Santa Fé Railway plans to construct additions and make improvements to its shops at Cleburne.

The Sinore Cattle Company, Fort Stockton, plans to install four irrigation pumping plants for watering about 6000 acres of land.

The Shippers' Compress Company, Houston, has increased its capital stock from $100,000 to $200,000. It will enlarge its cotton compress facilities.

The Southern Engine & Boiler Works, Dallas, has been organized with a capital stock of $5,000 by Henry H. Horr, H. R. Wofford and L. E. Burgess.

St. Louis

ST. LOUIS, Mo., Nov. 8, 1915.

With the market swept bare of stock, machine-tool dealers find the only question at issue with the purchaser is that of delivery. Price and even size of machine are of little consequence, apparently, as buyers are willing to take practically anything that can be made to serve the purpose. The only exception of consequence to this situation is drilling machines for which the demand is not so acute. Second-hand equipment has also disappeared from the floors and rebuilt machines are cleaned up. Deliveries now range from six to twelve months away, according to the type of equipment demanded. The attention of the dealers is being given to serving as far as possible their old trade. New industries are finding it particularly difficult to place orders for equipment as their plans must wait on the market conditions. Money is still easy at reasonable rates. Collections are reported above normal in all parts of St. Louis territory.

The Kansas City Radiator Company, Kansas City, Mo., will build a one-story factory at Thirty-first Street and Roanoke Boulevard. It has placed contracts with the E. W. Bliss Company, Brooklyn, N. Y., for metal-working machinery and expects to commence operations about Jan. 1. Plans are being made for the manufacture of about 2,000,000 ft. per year of sheet metal radiators. The capital stock of the company is $100,000.

The Jenkins Vulcan Spring Company, St. Louis, Mo., capitalized at $40,000, has been organized by T. B. Jenkins, J. J. Jenkins and others, to manufacture motor vehicle springs and other specialties.

The Hathaway Rotary Valve Motor Company, St. Louis, Mo., has been incorporated by Charles E. Hathaway, Charles H. Reeder and Joseph Mayer, with a capital stock of $175,000, to manufacture rotary valve internal combustion engines.

The St. Louis Fiber Company, St. Louis, Mo., has been incorporated with a capital stock of $100,000 by C. W. Brenizer, O. W. Miller and J. B. Furstenberg, St. Louis, and D. W. Losee and W. E. Boise, New York City, to equip a plant for the manufacture of fiber, pulp, etc.

The St. Louis public service board has completed plans for a water front terminal dock, to be equipped with mechanical loading devices, etc., at a cost of about $275,000.

John V. Kerber, St. Louis, will equip a plant for repair work on vehicles and automobiles and motors, to cost about $5,000.

The Springfield Gasoline Iron Company, Springfield, Mo., has been incorporated with a capital stock of $15,000 by H. H. Cole, and others, to equip a plant for the manufacture of patented sadirons.

The American Shoe Machinery Company, St. Louis, Mo., has increased its capital stock from $30,000 to $250,000 for the purpose of increasing its equipment.

The St. Charles Stay & Finding Company, St. Charles, Mo., will install equipment in a factory already acquired under lease. Charles Pierce is president.

The Kansas City Trunk Company, Kansas City, Mo., has been incorporated with a capital stock of $17,000 by Morris Bigus, Sam Sonin and Robert E. Rooney.

The United States Terra Cotta Company, Harvey, Ill., has been incorporated with a capital stock of $500,000 to manufacture clay wares. Louis G. Peters, C. H. Dalton and D. B. Copper are the principal stockholders.

A cement plant with a daily capacity of 2000 bbl. of cement will be equipped at Foreman, Ark., by the Consumers Portland Cement Company, Lumber Exchange Building, Chicago, Ill. It will be electrically driven throughout.

The D. H. Smith Iron Fence Post Company, Morrillton, Ark., has been incorporated with a capital stock of $20,000 by G. C. Martin, C. E. Simpson, C. C. Roberts and S. W. Simpson and is in the market for equipment.

A hardwood flooring and planing mill and a panel plant will be equipped at a cost of about $75,000 at Fayetteville, Ark., by the W. R. Shanklin Planing Mills Company, Lincoln, Neb., which is reported as in the market for the machinery.

Equipment wanted by the Yellville Light, Power & Ice Company, Yellville, Ark., includes one 75-kw. three-phase 60-cycle, 2300-volt direct-connected generator and engine, also exciter, etc. W. C. Stephenson is manager.

The Tulsa Portland Cement Corporation, Tulsa, Okla., will install at Lost City, Okla., a plant for the manufacture of bricks with an initial capacity of 20,000 bricks a day.

The Magnolia Pipe Line Company, Healdton, Okla., will install additional pumping equipment as well as a new pipe line to Addington, 26 miles distant.

The Mid Continent Company, Tulsa, Okla., has plans for the equipment of an oil refinery at Jennings, Okla.

The Sapulpa Refining Company, Sapulpa, Okla., will increase its refinery equipment to turn out 1000 bbl. more a day.

The Pan State Company, Tulsa, Okla., has acquired an 80-acre site and will equip an oil refinery of undetermined capacity.

The Auto Metallic Tire Company, Coalgate, Okla., has been incorporated with a capital stock of $100,000 by F. F. Green, M. Mayer and P. Greenan.

D. L. Rush & Son, Biloxi, Miss., are reported in the market for gasoline engines and electric generators.

The McComb & Magnolia Railway & Light Company, McComb, Miss., has been incorporated with a capital stock of $500,000 by M. R. Walter, S. M. Jones, and others, and has bought the plant of the McComb Electric Company, which it is planned to enlarge.

The Developers Oil and Refining Company, Shreveport, La., will equip a refinery at a cost of $250,000 and may increase contemplated expenditure to $1,000,000. R. M. Hyams, New Orleans, La., is president and H. J. Fernandez treasurer. The Great Southern Securities, Shreveport, is interested.

The John T. Gibbons Company, New Orleans, La., will equip a grain elevator, to cost about $250,000. Sam Stone, Jr., is supervising architect and engineer.

The Mohawk Motor Corporation, New Orleans, La., Hibernia Bank Building, will equip an automobile factory, to cost about $200,000. Plans have already been prepared. J. Bart Davis is president.

Monroe, La., will equip a waterworks plant and sewerage system, etc., to cost about $500,000. R. O. Morrison is engineer in charge, and H. D. Apgar is mayor.

The Pacific Northwest

SEATTLE, WASH., Nov. 2, 1915.

As a further evidence of the rapidly growing importance of the trade to Alaskan ports, the Pacific-Alaska Navigation Company, Seattle, operating the Admiral line, has recently purchased from the Rutland Transit Company, Ogdensburg, N. Y., two steel steam freighters, at a cost of $500,000. The vessels will be placed in the Seattle-Alaska freight trade as soon as they have been overhauled. Shipbuilding and repair plants in the Northwest have been kept unusually busy recently.

The Markham Pipe Joint Company, Aberdeen, Wash., has been incorporated for $100,000 by L. O. Markham and J. J. Phillipa.

Arrangements are now under way for the establishment by the United States Government of a high power radio station at Keyport, Wash., to cost, completed, about $25,000. It is understood that the station will be installed before Jan. 1, 1916.

According to report, Hugh L. Cooper, builder of the Kennekuk power plant, plans the construction of a power plant to cost $10,000,000 in the "Z" Canyon of the Pend d'Oreille River, near Metaline Falls, Wash. For more than six months Mr. Cooper and associates have been engaged in the completion of surveys at the proposed site.

The Hyde Ship Brake Company, Tacoma, Wash., has been incorporated for $1,000,000 by J. H. Hyde, C. P. Balabanoff, F. H. Murray, and others. It plans the erection of a plant in Tacoma for the manufacture of a patented device.

The Montana Improved Spring Wheel Company, Bozeman, Mont., has been incorporated, with James A. Johnson, Fromberg, Mont., as president and general manager. It plans the construction of a plant for the manufacture of a spring wheel for automobiles.

San Francisco

SAN FRANCISCO, CAL., Nov. 2, 1915.

The demand for machine tools is becoming more active, but as a rule is still not very urgent. Inquiries are numerous and occasional orders are booked for spring or summer delivery; but most buyers prefer to wait rather than pay the present extreme prices for delivery at a distant date. Small tools and general shop supplies are in fair demand, and operations at many local shops, which have been greatly restricted, are increasing. Shipbuilding operations continue to increase. Many country shops are well occupied with implements and mining machinery, and manufacturing industries in general are getting into better shape. While the lumber trade is very quiet, some important improvements are being made in mills and logging plants.

The shops of the Southern Pacific Railroad at Sacramento, Cal., are employing more men than for many months. Two shifts are working in the company's rolling mill.

It is reported that the Union Iron Works, San Francisco, is now employing over 3000 men, including a good-sized night shift, and that the plant will be busier this winter than for nearly ten years past. It is expected that work will be started about the first of the year on the new Hunters Point drydock.

The California Shipbuilding Company, recently organized at Los Angeles, with George H. Bixby as president, is about to take over the Craig shipbuilding plant at Long Beach, Cal., which has been awarded a contract for the construction of three submarines.

The Pacific Gas & Electric Company is making preparations to resume work on its system of hydroelectric plants in the vicinity of Auburn and Clipper Gap, Cal. Two power houses are to be completed.

The Utah Iron & Steel Company, which is erecting a plant at Midvale, Utah, filed articles of incorporation last week, with a capital of $500,000. C. W. Whitney is president, N. Rosenblatt vice-president, S. A. Whitney treasurer and S. Rosenblatt secretary. While the company's main purpose is said to be to handle scrap material, the purposes stated in the incorporation cover a wide range of iron and steel manufacturing.

Property owners of the Cheney Slough district, near Colusa, Cal., are figuring on the installation of an irrigation pumping plant on the Sacramento River. Charles de St. Maurice is the engineer.

The Richmond Brass Foundry Company will open for business shortly in the old Santa Fé Foundry at Richmond, Cal., which is being remodeled, and several new machines will be added. John Ecklund is manager.

Canada

TORONTO, Nov. 8, 1915.

From practically all manufacturing districts of Canada an improvement in October over the previous month was reported. While the bulk of this improvement was due to war orders, several industries also showed much activity. Business in all steel lines continues to improve. Companies receiving contracts for war material are continuing to purchase machinery which will be further stimulated by the heavy orders which are now being placed by the Canadian Munitions Committee. The larger steel companies will be in a position shortly to handle 8 and 9 in. shells, while the smaller companies, about 400 of whom put in tenders for the manufacture of shells, will continue to make the smaller sizes.

British orders aggregating $500,000,000 have come or are coming to Canada according to a statement made by D. A. Thomas, representative of the British Minister of Munitions. His work in Canada is now in the hands of Lionel Hichens, who arrived recently to represent the Minister of Munitions, David Lloyd-George, and who will have charge of the reconstruction of the Shell Committee. The main feature of the reorganization of the committee will be the retirement of those members who are interested in the manufacture of munitions. It is probable that the British Government will establish works here for the manufacture of heavy artillery, to be taken over by the Canadian Government at the end of the war.

An addition, 100 x 160 ft., to the main foundry of the Dominion Steel Foundry Company, Hamilton, Ont., is nearing completion. The company has installed one 25-ton acid open-hearth furnace and one 30-ton Shaw electric 4-motor crane. A complete outfit for machining 3-in. British shrapnel and machinery for finishing 4.5-in. howitzer shells has also been installed.

Delay in awarding the big contracts by the Shell Committee of Ottawa, Ont., for large sized shells, is caused by difficulty in securing definite quotations from the steel companies as to the basis of the charge to be made the manufacturers. A number of orders have been allotted, but no contracts are yet finally closed. Montreal manufacturers understood to have secured parts of the contract, include the Canada Cement Company, which it is reported will turn out 4000 machine-made and 2000 forged shells per week, for about $8,000,000 worth of shells; the Dominion Bridge Company and the Canadian Fairbanks Company, the Canadian Ingersoll-Rand Company and the Jenckes Machine Company of Sherbrooke, Que., will also get contracts. Practically every company now making the smaller shells is said to be in line for renewal orders.

The Defiance Iron Works, Chatham, Ont., has been sold to the American Well Works Company, Aurora, Ill., which will manufacture waterworks equipment, etc. It will build an extensive addition to the plant, which has been vacant for several years and is well equipped.

A. B. Jardine & Co., manufacturer of taps, screw plates, bolt-threading machines, etc., Hespeler, Ont., will build an addition to its plant.

The Empire Brass Company, London, Ont., will build an extension to its plant to cost $1,300.

The Electric Steel & Metals Company, Welland, Ont., will build a machine shop, 30 x 50 ft., and an office building to cost $30,000. The Standard Steel Construction Company has been awarded the contract.

The Canadian Tygard Engine, Ltd., 202 Royal Bank Building, Toronto, recently incorporated, has purchased land in East Toronto and will build a factory there for the manufacture of gasoline engines, motors, steam engines, etc.

The Solid Leather Company, Queen Street, Preston, Ont., will build an addition to its factory. J. Parker is manager.

The Canadian Ingersoll-Rand Company, Sherbrooke, Que., will build at once a machine shop to cost $50,000.

The Hamilton Aero Mfg. Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $50,000 to manufacture aeroplanes, motors, etc.

The Rawleigh-Schryer Company, Freeport, Ill., manufacturer of gas engines, has purchased a site of two acres at Hamilton, Ont., and will erect a factory there.

The National Car & Foundry Company, Hamilton, Ont., has received an order from the French Government for 3000 trucks for immediate delivery, with an option on a follow-up order for the same amount.

The Toronto Pattern Works, 65 Jarvis Street, Toronto, is in the market for patterns in wood or metal.

The Canadian Horse Shoe Company, Hamilton, Ont., has completed the erection of its building and is now installing machinery.

The Diaphone Signal Company, Ltd., Toronto, has been incorporated with a capital stock of $75,000 by Gideon Grant, Geoffrey W. Adams, 8 University Crescent; Edwin Smiley, and others, to manufacture signaling devices, etc.

The Lachance Nut Lock Company, Ltd., Montreal, has been incorporated with a capital stock of $300,000 by Joseph A. Bilodeau, Maurice Loranger, Bernard Melancon, and others, to make iron and steel, bolts, nuts, etc.

The National Steel Products, Ltd., Toronto, has been incorporated with a capital stock of $100,000 by Lionel C. Abbott, care Montreal Trust Company; Ernest P. Seon, Thomas Gibson, and others, to manufacture munitions, iron, steel, etc.

The Canadian Gaghan Construction Company, Ltd., Toronto, has been incorporated with a capital stock of $100,000 by John S. Denison, Room 701, Kent Building; Frank J. Foley, and others, to manufacture iron, steel, structural metal, etc.

The Eastern Machinery Company, Ltd., Montreal, has been incorporated with a capital stock of $45,000 by Armand Lalonde, Joseph O. Soucy, Joseph N. Cabana, and others.

The Renown Engine & Machine Company, Ltd., Montreal, has been incorporated with a capital stock of $50,000 by Leslie H. Boyd, Alexander R. Johnson, and others, to manufacture machinery, engines, pumps, tools, boilers, war munitions, etc.

Steel & Radiation, Ltd., Toronto, Ont., has been incorporated with a capital stock of $5,000,000 by James S. Lovell, 25 King Street West; Robert Gowans, John J. Dashwood, and others.

The Manual Constructor Company, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by John Chantler, 8 Wellington Street, East; Ernest W. Chantler, and others, to manufacture light hardware, toys, etc.

The Dominion Shell Mfg. Company, Ltd., Montreal, has been incorporated with a capital stock of $99,000 by H. C. Thorne, and others, to manufacture munitions, etc.

NEW TRADE PUBLICATIONS

Welding and Cutting.—Searchlight Company, Karpen Building, Chicago, Ill. Two pamphlets. The first is a book of specific information on the welding and cutting of metals by the oxy-acetylene process with a catalog of the equipment required for such work. After a brief discussion of what the oxy-acetylene process is and the way in which it can be used, the various types of cutting and welding torches and equipment are illustrated and described and a number of difficult operations are mentioned and shown. The other pamphlet deals with the way in which the company's acetylene gas is generated, purified and kept free from moisture after being made.

Lathes.—Lodge & Shipley Machine Tool Company, Cincinnati, Ohio. Bulletin No. 128. Devoted to the selective head type of engine lathe that is an all-geared machine in which any one of the spindle speeds may be selected instantly. The construction of the lathe is gone into at some length, and the text is supplemented by engravings of the various parts. Views of some of the machines that are built with this type of head are presented and a general dimension table of the several sizes is included.

Malleable Iron and Molding Machine Vibrator.—Malleable Iron Fittings Company, Branford, Conn. Two folders. The first points out the advantage of using the company's special metal "A" and refined vanadium iron. The various uses to which these two products can be put are touched upon and illustrations showing some of the parts for which they have been used are included. The other folder illustrates and describes a vibrator for molding machines which is made in ten sizes ranging from ⅜ in. to 2 in. in diameter.

Miter Cutting Machine and Steel Barrels.—Grinden Art Metal Company, 419 Marcy Avenue, Brooklyn, N. Y. Two circulars. The first is concerned with a machine for cutting miters in all kinds of steel shapes by using an emery wheel. Illustrations and condensed description of the machine, which was illustrated in THE IRON AGE, May 20, 1915, are included. The other circular describes steel barrels that are furnished with or without removable heads for shipping or storing material. A brief description of the barrel is presented with special reference to the lever arrangement for sealing the heads in place.

Revolving Shovels.—Ball Engine Company, Erie, Pa. Bulletin No. S-12. Deals with a line of revolving shovels suitable for handling a great variety of material. The design and operation of the shovel are gone into at some length, the text being supplemented by a number of halftone engravings and line drawings. Specifications of the shovel are included, together with a number of views of it in use.

Hydraulic Presses and Pumps.—Hydraulic Press Mfg. Company, Mount Gilead, Ohio. Folder. Shows the exhibit of the company at the Panama-Pacific International Exposition and the plant in which the presses and pumps shown were designed and built. A brief description of the exhibition of this company appeared in THE IRON AGE, July 15, 1915.

Barometric Condenser.—Mesta Machine Company, Pittsburgh, Pa. Bulletin R. Shows the saving effected by the use of a barometric condenser and describes its construction. The freedom from clogging and the elimination of a free exhaust valve are touched upon followed by a description of the condenser and the way in which it operates. The text matter in the bulletin is supplemented by a number of views of installations of the condensers and the air pumps supplied with them.

Electric Generators and Motors.—Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Four leaflets. The first two, Nos. 2389 and 2390, deal with alternating-current generators, equipped with belt and engine drives, respectively. The generators, which range in capacity from 25 to 1750 kw., are illustrated and described and a number of installation views of each type are included. The third leaflet, No. 3787, illustrates and describes the type CS large squirrel cage induction motors, which have been especially designed for heavy duty, constant speed, continuous service. The construction of the motor is given in some detail. The fourth leaflet, No. 3811, describes the installation of electric drive in steel mills, the text being supplemented by a curve indicating the growth of this form of power throughout the country.

Ring Wheel Grinding Machine.—Charles H. Besly & Co., 118 North Clinton Street, Chicago, Ill. Bulletin No. 17. Describes and illustrates a wide face ring wheel grinding machine which is designed to replace milling, planing and shaping machines in a shop where rapid and accurate production is required. Mention is made of the various advantages of this machine such as the ability to grind larger and rougher work over the entire surface at once without chucking, elimination of tool-making expense in connection with cutters, etc. Views of a number of pieces that have been ground by the machine, which was illustrated in THE IRON AGE, Oct. 28, 1915, are included.

Arbor Press.—United Engine & Mfg. Company, Hanover, Pa. Bulletin No. 22. Illustrates an arbor press of the long range type having a capacity of 10 tons. The features of the press, such as a leverage of 100 to 1, ease of raising and lowering the table and the adjustment of the sliding V block on the table to suit different sizes of arbors are touched upon. The general construction of the press is gone into at some length and condensed specifications are included.

Tools.—Silver Mfg. Company, Salem, Ohio. Catalog and price list. Calls attention to a line of carriage makers', woodworkers' and blacksmiths' tools which includes hub boring and spoke tenonning machines, band and swing saws, saw tables, portable forges, mechanical blowers and hand and power drilling machines. Illustrations of the various machines are presented with brief descriptions and tables of the sizes in which they can be supplied.

Metal Roofing and Shingles.—Globe Iron Roofing & Corrugating Company, Cincinnati, Ohio. Circular and metal sample. Pertains to a line of patent lock plain and corrugated roofing and cluster shingles in which a hook on one sheet fits into a slot in the other. Views of the various styles of roofing and shingles that can be supplied with this special lock are presented together with directions for applying the material.

Perforated Metals.—Charles Mundt & Sons, 53 Fairmount Avenue, Jersey City, N. J. Booklet. Size, 3¼ x 6 in.; pages, 88. Contains illustrations of the various sizes and styles of perforations that can be made in sheets of steel, copper, brass, bronze, aluminum, zinc, lead and various other metals. A list of the uses to which these metals are put is given and views of screen sections are included. There is practically no text in the booklet, each page having an illustration of some particular perforation with a caption giving the number of the hole, its dimensions and either the number per square inch or the distance between centers.

Electric Measuring Instruments.—Roller-Smith Company, 203 Broadway, New York. Circular. Refers to a line of ammeters and voltmeters for use in connection with small battery-charging outfits, small switchboards and similar applications. The advantages of using the instruments for this work are presented, followed by a brief description of the instruments and a table of the sizes in which they can be furnished.

Taps and Dies.—Butterfield & Co., Inc., Derby Line, Vt. Catalog No. 16. Refers to a line of taps, dies, reamers and screw plates. In most cases, after a set of diagrams showing the proportions of the various threads in standard use, a separate page is given to each line of tool covered. An illustration of the tool or, in the case of screw plates, the sets that can be furnished, is given followed by a table showing the various sizes or combinations that can be supplied. A comprehensive index completes the catalog.

Screw Machines and Screw Machine Products.—National-Acme Mfg. Company, Cleveland, Ohio. Calendar, size 12 x 15 in. Each of the twelve leaves contains an illustration of a screw machine or some of its products or accessories in the upper portion while the lower section gives the calendar for the present month in large type with that for the previous and following month in smaller type underneath. As is the usual custom the calendar begins with Nov. 1 and runs a complete year.

Automatic Screw-Driving Machine.—Reynolds Pattern & Machine Company, 101 Third Avenue, Moline, Ill. Pamphlet. Presents briefly the advantages of using power screw-driving machines which are chiefly the reduced cost of assembly and a greater output. This is supplemented by a description of the operation and construction of an automatic screw-driving machine with magazine feed, and in turn is followed by illustrations of the several types of machines that can be supplied, with brief statements of the special features and the class of work handled by each. One of the machines illustrated in addition to driving screws is arranged with a boring attachment for making the hole into which the screw is driven. This machine was illustrated in THE IRON AGE, June 3, 1915. Some of the special machines which the company is prepared to build are illustrated and a partial list of users is included.

Seamless Tanks.—Janney, Steinmetz & Co., Philadelphia, Pa. Pamphlet. Covers a line of seamless steel tanks for storing air and gasoline. The different shapes of tanks that can be supplied are shown and tables of capacities are included.